treated 70:69 completed eradication but one did not (adverse reaction to the antibiotics). Five were not treated on advice of the test-requesting clinician. The remaining seven patients were managed by ward staff (treatment advised by SpN) or by patient's General Practitioner (GP) on advice given in the endoscopy report. *Post-eradication follow-up UBT:* All 69 patients treated by SpN had UBT arranged but 10 defaulted the appointment. No follow-up UBT request was recorded in our hospital for the seven treated by ward staff or GPs.

Conclusion

1. The measures put in place have resulted in near-complete action but gaps in after-care identified: All SpN managed patients had follow-up UBT arranged (15% failed to attend) while those treated by others had no follow-up UBT.
2. Hence our management system is being tightened particularly for patients treated by ward teams & GPs by:

- Ensuring endoscopy reports give specific advice on *Hp* treatment and follow-up UBT.
- SpN to be emailed an additional monthly collated list of seropositives from the Microbiology lab, enabling cross-check to identify/pursue those missed for treatment/follow-up UBT.

Competing interests None declared.

REFERENCE

1. *Gut* 2011;**60**(Suppl 1):A106. Abst PTU094.

Intestinal failure

PMO-027 VARIABILITY IN THE CONTENT OF ORAL REHYDRATION SOLUTION USED IN INTESTINAL FAILURE MAY RENDER IT INEFFECTIVE

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A Culkin.* *St Mark's Hospital, Harrow, UK*

Introduction The focus of treatment in patients with intestinal failure (IF) is to reduce intestinal losses, therefore preventing dehydration and electrolyte disturbances. This is achieved by restricting oral fluid intake and using an oral rehydration solution (ORS) with a sodium content of 90 mmol/l. Compliance can be poor and it is usual to allow patients to add a small amount of flavouring to the ORS. Research has indicated that this reduces the sodium content rendering the solution no longer suitable.[1] We aimed to investigate the variability in composition and the effect of adding flavouring.

Methods A sample of ORS made up by the ward staff was analysed for sodium, glucose and osmolality daily over 5 days. The ORS from day 5 was then used and a further five samples were analysed after patients has added their preferred type and amount of flavouring. The mean and SD were calculated.

Results There was a large variability in the sodium (mean 162±44 mmol/l, range 100–224) and glucose (105±27 mmol/l, range 85–150) content and the osmolarity (413±109 mmol/l) of the ORS made on the ward over the 5-day period. The addition of the flavourings decreased the sodium content (mean of 33±14 mmol/l, range 10–49) and increased the glucose content (mean 93±59 mmol/l, range 7–164) of the ORS. The osmolality also increased (mean 229±113 mOsmol, range 23–376).

Conclusion There was considerable variability in the content when ORS are made up on the hospital ward. Adding flavourings may render the ORS less effective by reducing the sodium and increasing the glucose and osmolarity. The results indicate a need for a pre-flavoured packaged ORS with a sodium content of 90 mmol/l.

Abstract PMO-027 Table 1

	Sodium (mmol/l)	Glucose (mmol/l)	Osmolarity (mOsmol)
Day 5	168	111	419
Flavouring added to day 5 ORS	Change in sodium (mmol/l)	Change in glucose (mmol/l)	Change in osmolarity (mOsmol)
Lime cordial	−36	+123	+262
Lime cordial	−49	+164	+376
Orange squash	−10	+7	+23
Lemon barley	−37	+95	+187
High juice (pineapple)	−33	+77	+295
Mean±SD	−33±14	+93±59	+299±59

Competing interests None declared.

REFERENCE

1. **Williams J**, *et al.* Effect of flavouring on isotonic solutions for short bowel syndrome. *Gut* 2003;**52**(Suppl 1):A10.

PMO-028 THE POTENTIAL OF SOUP AND SAVOURY DRINKS FOR ORAL HYDRATION IN SHORT BOWEL SYNDROME WITH JEJUNOSTOMY

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P Turner.* *Department of Dietetics, Royal Liverpool University Hospital, Liverpool, UK*

Introduction Patients with short bowel syndrome (SBS) and a jejunostomy are required to drink unpalatable electrolyte solutions. This is because the jejunal mucosa is permeable to sodium (Na) and whenever fluids containing <90 mmol/l Na are present in the lumen, water and Na are lost by diffusion leading to massive stoma losses. Patients are advised to consume 1000 mls of a glucose/saline electrolyte solution with >90 mmol/l Na while restricting other fluids to around 500 mls/day.[1] Electrolyte solutions are unpalatable and compliance is often poor. Although glucose is a significant component of these solutions due to coupled absorption of glucose, Na and water, a high Na content is of primary importance as there is considerable passive diffusion of Na and water across concentration gradients between the jejunal lumen and plasma.[2] Soups and meat extracts are high in Na but appear to be a relatively unused resource in SBS. This may be because health professionals are unaware of their Na content. A survey of such products was carried out to see if their Na content was high enough to replace some or all of the usual electrolyte drinks.

Methods Manufacturers UK websites were accessed to obtain the Na and fibre content of four brands of tinned soups (Heinz, Baxter's, Campbell's and Sainsbury's), four brands of instant cup soup (Bachelor's, Tesco, Campbell's and Ainsley Harriott) and one brand of meat extract (Bovril).

Results Results were obtained for 57 samples of tinned soup, 48 samples of cup soup and two meat extracts. Na content of soups reconstituted as per manufactures recommendations. Na concentrations of beef and chicken extracts were 96 and 156 mmol/l respectively when made up as 12 g in 250 mls water. Mean fibre content for tinned soup and cup soup was 0.65 g and 0.6 g per 100 ml respectively (range 0–3.3 g/100 ml).

Conclusion The majority of products investigated contain >90 mmol/l Na and are suitable for consumption by patients with jejunostomies. Patients can be advised to check food labels for products containing >0.21 g Na/100 ml (91 mmol/l). Fibre content of soup is relatively low however patients can be advised to seek lowest fibre varieties if this is an issue. In conclusion, soups or meat extracts could be considered as a partial replacement for electrolyte drinks where compliance is poor, provided there is careful initial monitoring of fluid balance and biochemistry.

Abstract PMO-028 Table 1

Product	Number	Mean Na g/100 ml	Mean Na mmol/l	Median Na mmol/l	Range Na mmol/l	SD mmol/l
Tinned soups	57	0.23	100	100	52–130	21
Cup soups	48	0.22	96	96	65–148	17

Competing interests None declared.

REFERENCES

1. **Nightingale J,** Woodward JM; On behalf of the Small Bowel and Nutrition Committee of the BSG 2006. Guidelines for management of patients with a short bowel. http://www.gut.bmjjournals.com
2. **Fordtran JS,** *et al.* The mechanisms of sodium absorption in the human small intestine. *J Clin Invest* 1968;**47**:884.

Basic science (nutrition)

PMO-029 PREHABILITATION PROGRAM FOR LIVER SURGERY

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[1]D Dunne,* [1]R Jones, [1]H Malik, [1]G Poston, [2]D Palmer, [3]S Jack, [1]S Fenwick. *[1]Northwestern Hepatobiliary Centre, Aintree University Hospital, Liverpool, UK; [2]Department of Oncology, University of Liverpool, Liverpool, UK; [3]Department of Respiratory Medicine, Aintree University Hospital, Liverpool, UK*

Introduction Rehabilitation exercise programs improve recovery from surgery and quality of life. Prehabilitation improves fitness prior to surgery. This is challenging before liver resection as patients tend to be sedentary and time is limited. Our aim was to design a 4 week program, suitable for sedentary individuals, which would yield a 1.5 ml/kg/min increase (10%) in the relative VO_2 uptake at the anaerobic threshold (AT), as measured by a cardiopulmonary exercise test (CPET).

Methods Interval based exercise program of 12 sessions on a stationary bike. Each session 40 min long consisting of six intervals, warm up and cool down. The interval intensities were calculated using anaerobic threshold detected by initial CPET. AT is independent of volition and can be detected with reliability in most patients. This represents a measure for designing exercise programs for patients. Eleven healthy volunteers completed the exercise program.

Results The 11 volunteers had a mean age of 46 years (range 38–60). They consisted of two men nine women. Mean BMI 30.7 (range 25.5–39.2), two smokers, nine non-smokers, no significant comorbidities. 96% attendance with 9/11 volunteers achieving 100% attendance. Mean relative VO_2 at AT was 12.4 ml/kg/min pre exercise program and 14.0 ml/kg/min post exercise program, a 12% improvement ($p<0.001$). Mean resting O_2 uptake decreased by 28% (p-0.014). There was a trend to lower resting O_2 pulse rate. At AT significant differences were achieved in mean O_2 pulse (+11.6%), and power (25.7%) $p<0.001$. Peak values also improved with mean peak O_2 pulse climbing by 10.7% (p-0.001), and mean peak power by 14.7% (p-0.006).

Conclusion This is the first 4 week exercise program designed for patients prior to liver resection and the only 4 week exercise program based round AT. It is feasible in sedentary healthy volunteers and achieves a >10% fitness improvement. An RCT is underway assessing this program's feasibility in patients prior to liver resection. Using our CPET risk stratification protocol a 10% fitness improvement in these patients would move 30% of our patients from high to low operative risk.

Competing interests None declared.

PMO-030 SOLUBLE PLANT FIBRES, PARTICULARLY LEEK AND PLANTAIN, INHIBIT ADHERENCE OF DIARRHOEA-ASSOCIATED PATHOGENS *C DIFFICILE* AND ENTEROTOXIGENIC *ESCHERICHIA COLI* TO INTESTINAL EPITHELIAL CELLS

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H L Simpson,* C L Roberts, J M Rhodes, B J Campbell. *Department of Gastroenterology, University of Liverpool, Liverpool, UK*

Introduction It has long been thought that dietary fibre promotes intestinal health and we have previously shown that the soluble non-starch polysaccharide (NSP) from plantain bananas (*Musa* spp.) can inhibit the epithelial adhesion and microfold (M)-cell translocation of Crohn's-associated *Escherichia coli* (*Gut* 2010;**59**:1331–9) and a range of diarrhoeal pathogens including *Salmonella* and *Shigella* (*Gut* 2011;60:A96). Here we examined NSP from representative examples of monocotyledon and dicotyledon plant fibres, for efficacy to inhibit epithelial interactions of *Clostridium difficile*, a major cause of antibiotic associated diarrhoea, and enterotoxigenic *E coli* (ETEC), the commonest cause of traveller's diarrhoea.

Methods Human intestinal epithelial cell-line Caco2-cl1 cell monolayers were pre-treated for 30 min with NSP preparations, including those from vegetable (broccoli, leek), fruit (plantain, apple) and cereal (oat) sources, followed by infection with *C. difficile* (for 2 h, at multiplicity of infection MOI of 100) or ETEC (4 h; MOI 100). In parallel experiments, adherence of bacteria to cell monolayers was examined following fixation, Giemsa stain and light microscopy.

Results *C difficile* adhesion to Caco2-cl1 cells was significantly inhibited in the presence of broccoli, leek and plantain NSP. Leek NSP, at 5 mg/ml, had the most significant effect on inhibition of *C difficile* adhesion (54.9±9.7% reduction) compared to untreated controls (n=3–9, $p<0.001$, ANOVA). Neither apple nor oat NSP had any significant ability to prevent *C difficile* adhesion to CaCo2-cl1 cells. ETEC adhesion to CaCo2-cl1 cells was also significantly inhibited in the presence of leek NSP (53.7±13.6%; $p<0.01$) and plantain NSP (40.9±9.3%; $p<0.001$) but no efficacy was observed for soluble broccoli, apple nor oat fibre. Blockade of adherence to Caco2-cl1 cells by NSP was also confirmed by Giemsa stain.

Conclusion Leek, plantain and/or broccoli NSP show efficacy at blocking *C difficile* and ETEC adhesion in a dose dependent manner to the intestinal epithelium in vitro and at concentrations readily achievable in vivo. The close proximity of *C difficile* and ETEC to the host epithelium is almost certainly essential for the release of their respective toxins and the exertion of their pathogenic effect. Disruption of bacterial-epithelial adherence to the intestinal mucosa by soluble plant fibres may therefore be of therapeutic benefit.

Competing interests H Simpson grant/research support from: industrial case studentship with support from Provexis plc, C Roberts conflict with: past employee of Provexis plc, J Rhodes consultant for: is a member of advisory boards for Atlantic, Procter and Gamble and Falk, speaker bureau with: Has received speaking honoraria from Abbott, Falk, Ferring, Glaxo Smith Kline, Procter and Gamble, Schering Plough, Shire and Wyeth, Conflict with: holds a patent with the University of Liverpool and Provexis UK for use of a soluble fibre preparation as maintenance therapy for Crohn's disease plus a patent pending for its use in antibiotic-associated diarrhoea, B Campbell grant/research support from: grant support from Provexis plc and the Bo & Vera Axson Johnson Foundation Ltd.