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Dr Schär Institute

The low-FODMAP diet for IBS management

In previous issues of the Forum we have uncovered the links between IBS and gluten sensitivity. We now consider the research behind the low FODMAP diet and it's potential application in the management of IBS symptoms.

A number of contemporary reports provide evidence of symptom resolution for some IBS sufferers whilst following a gluten free diet. Research has indicated that anti-gliadin antibodies are present in approximately 12% of the general population, versus 17% of IBS patients in whom coeliac disease has been excluded.[1,2] It has also been reported that the response to a gluten free diet amongst a sub-group of IBS diarrhoea predominant patients without evidence of coeliac histology can be predicted by the presence of intestinal antibodies (to gluten)[3] and the expression of HLA DQ2 or DQ8 genotypes[4], known to be associated with CD. The low FODMAP diet restricts the intake of fermentable, poorly absorbed, short chain carbohydrates (fermentable oligosaccharides, disaccharides, monosaccharides and polyols) such as fructans, present in wheat, on the basis that they provoke gastrointestinal symptoms in IBS patients through mechanisms that interplay with gut microbiota, gas production and gut fermentation. The success of this approach has led some researchers in the field to ponder the question of whether gluten is the only cause of symptoms in IBS patients reporting sensitivity to wheat, or whether other components of the wheat grain may be responsible for inducing symptoms. The multifactorial nature of IBS etiology would suggest that the answer to this dilemma is complex and the explanations for a positive symptom response on a wheat free diet may vary between individuals.

REFERENCES

1 Sanders DS et al. (2001) Association of adult coeliac disease with irritable bowel syndrome: a case-control study in patients fulfilling ROME II criteria referred to secondary care. Lancet; 3; 358(9292): 1504-8

2 Sanders DS et al. (2003) A primary care cross-sectional study of undiagnosed adult coeliac disease. Eur J Gastroenterology & Hepatology; 15(4): 407-13

3 Wahnschaffe U et al. (2007) Predictors of clinical response to gluten-free diet in patients diagnosed with diarrhoea- predominant irritable bowel syndrome. Clin Gastroenterol Hepatol; 5(7): 844-50

4 Wahnschaffe U et al (2001) Celiac Disease Like abnormalities in a sub-group of patients with irritable bowel syndrome. Gastroenterology; 121: 1329-1338.

FODMAP

FODMAPs: is the evidence stacking up?

A diet low in short-chain fermentable carbohydrates (FODMAPs) is fast becoming an accepted dietary treatment for irritable bowel syndrome (IBS) and other functional bowel disorders due to its powerful effect on reducing gastrointestinal symptoms.[1]

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The concept that certain individual carbohydrates, e.g. lactose, fructose and sorbitol induce IBS-like symptoms in susceptible individuals is not new, however grouping short-chain fermentable carbohydrates together and reducing their overall dietary intake is novel.[2] The low FODMAP diet originated in Australia and was successfully introduced to the UK five years ago.

What are FODMAPs and where do they occur?

The term FODMAP is an acronym for **f**ermentable **o**ligisaccharides, **d**isaccharides, **m**onosacharides **a**nd **p**olyols. Oligosaccharides include fructans and galacto-oligosaccharides which are chains of varying length of either fructose or galactose units, respectively, with a glucose terminal end. Fructans include inulin (DP 2-60), oligofructose (DP 2-8) and fructo-oligosaccharides (DP <10)[3] and dietary sources include wheat, onion and garlic. Galacto-oligosaccharides include raffinose and stachyose and typical dietary sources are beans and pulses. **Oligosaccharide absorption in the gastrointestinal tract is very limited (less than 5%)** due to humans lacking the enzymes that are able to break down the glycosidic bonds.[4,5]

Lactose is a disaccharide that is hydrolysed in the jejunum by a β-galactosidase enzyme called lactase. Lactase expression is at its peak just after birth, however it starts to decline after the first few months of life in up to 70% of humans, and in some, reduces to such a level that doses of greater than 4 g of lactose can be malabsorbed and lead to IBS-like symptoms

> Lactase expression is at its peak just after birth, however it starts to decline after the first few months of life in up to 70% of humans.

in susceptible individuals.[6] Lactose naturally occurs in mammalian milk and is often added to manufactured foods to improve taste and texture and to pharmaceutical agents as a bulking agent.

The monosaccharide **fructose** is absorbed across the intestinal membrane by facultative transport pathways, two of which are reasonably well understood. The first transporter is GLUT5, which is specific to fructose but there is a limit to the absorption capacity. The second is a hexose transporter called GLUT2 which co-transports glucose and fructose.[7] An equal amount of fructose and glucose is optimal for fructose absorption, however, fructose malabsorption is not uncommon and is observed in 30-60% of people.[8] Fructose is found naturally in fruit and honey and fructose ingredients are increasingly used in the food industry to enhance taste and texture in food products.

Polyols are sugar alcohols (e.g. sorbitol, mannitol, xylitol) and are passively absorbed along the small intestine at a variable rate depending on their molecular size, the intestinal pore size, organic disease and small intestinal transit time.[1] Malabsorption of a 10g dose of sorbitol has been reported in 60-70% of people.[9]

Lactose, fructose and polyols have the potential to become FODMAPs when they are malabsorbed.

Mechanisms for symptom generation

There are two well described mechanisms that FODMAPs exert in the gastrointestinal tract that can lead to IBS-like symptoms in susceptible individuals.

Osmotic activity

Malabsorption of short-chain carbohydrates renders them as osmotically active in the gastrointestinal lumen. In patients with an ileostomy, a high FODMAP diet produced approximately **20% more total ileal effluent, water and dry weight** when compared to a low FODMAP diet.[10] Furthermore, in healthy subjects, mannitol or fructose lead to a **ten-fold increased small intestinal water content** on magnetic resonance imaging (MRI) when compared with glucose or a combination of equal quantities of glucose and fructose.[11,12] An increase in small intestinal water content may lead to luminal distension, abdominal pain, borborygmi and eventual diarrhoea in susceptible individuals.

Fructose malabsorption affects approximately 30–60% of the general population.[8]

Malabsorption of a 10 g dose of sorbitol has been reported in 60–70% of people.[9]

Adherence to a low-FODMAP diet improved all IBS symptoms for 85% of patients with fructose malabsorption.

Colonic fermentation

When FODMAPs reach the colon they are readily fermented by the colonic microbiota producing gas e.g. hydrogen. In patients with visceral hypersensitivity, increased gas production can lead to symptoms of abdominal distension and abdominal pain. Hydrogen breath tests are useful to measure colonic gas production following carbohydrate ingestion. Several mechanistic studies have indeed reported increased hydrogen production in healthy volunteers and patients with IBS following consumption of individual or combinations of FODMAPs.[12,13] Furthermore, patients with IBS reported increased gastrointestinal symptoms on a high FODMAP diet.[13]

Clinical evidence

Despite all this high quality mechanistic data, does the low FODMAP diet improve symptoms of IBS in clinical practice? The evidence base for uncontrolled and more recently controlled studies on the efficacy of the low FODMAP diet is increasing. A retrospective assessment of patients with fructose malabsorption who had adhered to a low FODMAP diet showed that 85% had improvement for all IBS symptoms.[14] This study was followed by a FODMAP challenge cross-over feeding study by the same group. Patients who had previously had success with the low FODMAP diet were challenged with increasing doses of fructose and/or fructans and glucose as a control while following a low FODMAP diet where the majority of food was provided for the duration of the study. Symptoms were assessed during each challenge and showed that fructose and/or fructans significantly induced overall and individual (bloating, abdominal pain and flatulence) IBS symptoms. In addition this study demonstrated a dose response to fructose and/or fructans with increasing symptoms at higher doses.[15]

A non-randomised controlled trial compared IBS symptoms at follow-up in patients who had been treated with a low FODMAP diet or as the control, standard dietary advice based on the NICE guidelines (National Institute for Health and Care Excellence).[16] This study demonstrated that 76% of patients who had been given low FODMAP advice had an improvement in overall symptoms compared to **54% in the standard dietary advice group**.[17] However, major limitations of this study were that it was not randomised and only recorded symptoms at follow-up.

Three randomised controlled trials (RCTs) assessing a low FODMAP diet in IBS have been completed. The first was a cross-over feeding study comparing 4 days of a low and a high FODMAP diet. This study showed that symptoms were much lower on the low FODMAP diet.[13] The next RCT, another feeding study,

76 % of patients following a low-FODMAP diet report a general improvement in the symptoms

had a cross-over design and showed that overall symptoms, abdominal pain, bloating and flatulence were all significantly lower after 3 weeks of a low FODMAP diet when compared to a high FODMAP diet.[18] The problem with feeding studies is that they do not reflect normal every day challenges faced when choosing food on a restrictive diet. The last RCT to date compared 4 weeks of a low FODMAP diet with a habitual diet. Both groups received dietary advice from a specialist dietitian and showed that **symptoms were adequately controlled in 68% of patients following the low FODMAP diet compared to only 23% in the control group**.[19]

Safety

A low FODMAP diet restricts a wide variety of foods from some starchy cereal grains, fruit and vegetables, milk and milk products and processed foods containing any high FODMAP ingredients. Alternative suitable foods are a key component of patient education and even under strict advice from a dietitian, it has been shown that nutrient intakes, calcium in particular, can be compromised on a low FODMAP diet.[19] Diet has a dramatic effect on the composition of the gastrointestinal microbiota and patients with IBS have been reported to have dysbiosis. The prebiotic effects of some carbohydrates (e.g. fructo-oligosaccharides and galacto-oligosaccharides) is well established, so reducing their intake as part of a low FODMAP diet is of potential concern. Indeed, a significant decrease in the concentration of luminal bifidobacteria after 4 weeks of a low FODMAP diet has been observed.[19] However, whether this reduction is problematic in the short or long term is currently unknown but warrants further investigation.

Clinical practice

The evidence clearly supports using a low FODMAP diet in clinical practice, however, research only supports its use as a dietitian-led service. Dietitians need to have the expertise in the low FODMAP approach to be able to effectively educate patients and use appropriate outcomes to measure symptom response.[20] Furthermore, **strict FODMAP restriction is advised only over a short period of up to 8 weeks**, following which, FODMAP reintroduction to individual tolerance in relation to gastrointestinal symptoms is recommended to increase dietary variety, ensure nutritional adequacy and have as minimal impact on the gastrointestinal microbiota.

INFO Strict FODMAP restriction is advised only over a short period of up to 8 weeks before reintroduction to determine individual tolerance.

REFERENCES

1 Staudacher H. M., Irving P. M., Lomer M. C., Whelan K. Mechanisms and efficacy of dietary FODMAP restriction in IBS. Nature Gastro Hep. 2014 [Epub ahead of print]

2 Shepherd S. J., Lomer M. C., Gibson P. R. Short-chain carbohydrates and functional gastrointestinal disorders. Am J Gastroenterol 2013;108(5):707–717

3 Roberfroid M. B. Inulin-type fructans: functional food ingredients. J. Nutr. 2007:137 (Suppl. 11), 2493S–2502S

4 Bach Knudsen K. E., Hessov I. Recovery of inulin from Jerusalem artichoke (Helianthus tuberosus L.) in the small intestine of man. Br. J. Nutr. 1995:74, 101–113

5 Macfarlane G. T., Steed H., Macfarlane S. Bacterial metabolism and health-related effects of galacto-oligosaccharides and other prebiotics. J. Appl. Microbiol. 2008:104, 305–344

6 Lomer M. C. E., Parkes G. C., Sanderson J. D. Lactose intolerance in clinical practice: myths and realities Aliment Pharmacol Ther 2008: 27; 93–103

7 Jones H. F., Butler R. N., Brooks D. A. Intestinal fructose transport and malabsorption in humans. Am. J. Physiol. Gastrointest. Liver Physiol. 2011:300, G202–G206

8 Rumessen J. J., Gudmandhoyer E. Absorption capacity of fructose in healthy-adults – comparison with sucrose and its constituent monosaccharides. Gut 1986:27, 1161–1168

9 Yao C. K., Tan H. L., van Langenberg D. R., Barrett J. S., Rose R., Liels K., Gibson P. R., Muir J. G. Dietary sorbitol and mannitol: food content and distinct absorption patterns between healthy individuals and patients with irritable bowel syndrome. J. Hum. Nutr. Diet 2013 [Epub ahead of print]

10 Barrett J. S., Gearry R. B., Muir J. G., Irving P. M., Rose R., Rosella O., Haines M. L., Shepherd S. J., Gibson P. R. Dietary poorly absorbed, short-chain carbohydrates increase delivery of water and fermentable substrates to the proximal colon. Aliment. Pharmacol. Ther. 2010:31, 874–882

11 Marciani L., Cox E. F., Hoad C. L., Pritchard S., Totman J. J., Foley S., Mistry A., Evans S., Gowland P. A., Spiller R. C. Postprandial changes in small bowel water content in healthy subjects and patients with irritable bowel syndrome. Gastroenterology 2010:138, 469–477.e1

12 Murray K., Wilkinson-Smith V., Hoad C., Costigan C., Cox E., Lam C., Marciani L., Gowland P., Spiller R. C. Differential effects of FODMAPs (fermentable oligo, di, mono-saccharides and polyols) on small and large intestinal contents in healthy subjects shown by MRI. Am. J. Gastroenterol. 2013 [Epub ahead of print]

13 Ong D. K., Mitchell S. B., Barrett J. S., Shepherd S. J., Irving P. M., Biesiekierski J. R., Smith S., Gibson P. R., Muir J. G. Manipulation of dietary short chain carbohydrates alters the pattern of gas production and genesis of symptoms in irritable bowel syndrome. J. Gastroenterol. Hepatol. 2010:25, 1366–1373

14 Shepherd S. J., Gibson P. R. Fructose malabsorption and symptoms of irritable bowel syndrome: guidelines for effective dietary management. J. Am. Diet Assoc. 2006:106, 1631–1639

15 Shepherd S. J., Parker F. C., Muir J. G., Gibson P. R. Dietary triggers of abdominal symptoms in patients with irritable bowel syndrome: randomized placebo-controlled evidence. Clin. Gastroenterol. Hepatol. 2008:6, 765–771

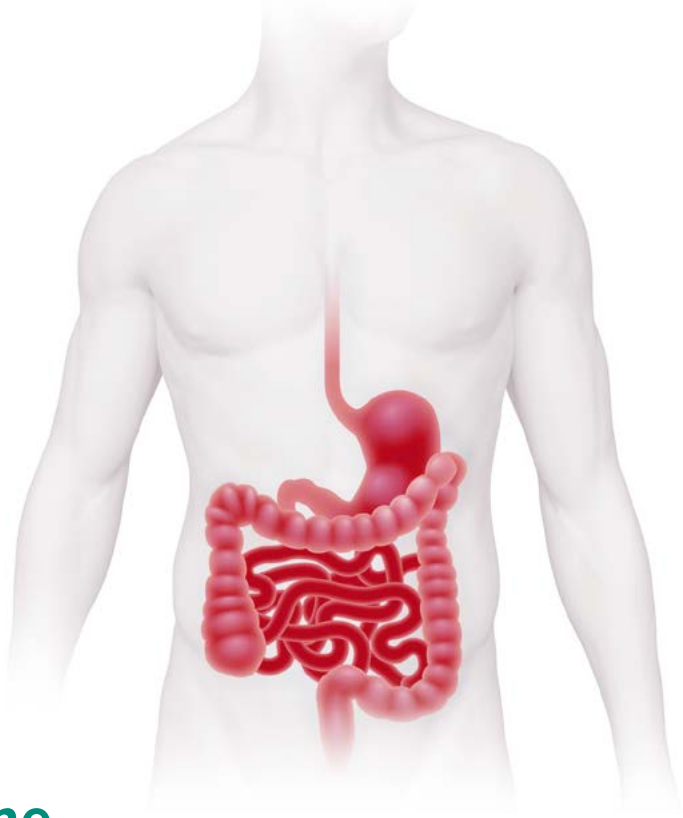
16 National Institute for Health and Care Excellence Guideline Development Group. Irritable bowel syndrome in adults: Diagnosis and management of irritable bowel syndrome in primary care London: NICE, 2008. www.nice.org.uk/CG061 [accessed 11/03/2014]

17 Staudacher H. M., Whelan K., Irving P., Lomer M. C. Comparison of symptom response following advice for a diet low in fermentable carbohydrates (FODMAPs) versus standard dietary advice in patients with irritable bowel syndrome. J Hum Nutr Diet 2011:24(5);487–495

18 Halmos EP, Power VA, Shepherd SJ, Gibson PR, Muir JG. A diet low in FODMAPs reduces symptoms of irritable bowel syndrome. Gastroenterology Sept 2013 [Epub ahead of print]

19 Staudacher H. M., Lomer M. C., Anderson J. L., Barrett J. S., Muir J. G., Irving P. M., Whelan K. Fermentable carbohydrate restriction impacts on luminal bifidobacteria and gastrointestinal symptoms in a randomized controlled trial of patients with irritable bowel syndrome. J Nutr 2012:142(8);1510–1518

20 McKenzie Y., Alder A., Anderson W., Brian A., Goddard L., Jankovich E., Mutch P., Reeves L., Singer A., Lomer M. C. E. British Dietetic Association evidence-based practice guidelines for the dietetic management of irritable bowel syndrome (IBS) in adults. J Hum Nutr Diet. 2012:25(3);260–274



The Low FODMAP Diet for Irritable Bowel Syndrome

IBS is a chronic and debilitating functional gastrointestinal disorder with research suggesting that it effects at least 10% of the UK, European and US population.[1,2]

Most IBS treatment is managed in primary care[3] with 1 in 12 consultations with a general practitioner (GP) being based around gastrointestinal problems and 46% of these being diagnosed with IBS.[3] However, GPs have little knowledge of the diagnostic criteria for IBS and often inappropriately refer for specialist consultations and/or prescribe a number of drugs.[4,5] Spiegel's research suggested that despite clear Rome criteria for the diagnosis of IBS, over 70% of community practitioners still incorrectly treat IBS as a 'diagnosis by exclusion'.[6]

In excess of 2.34 million people in the UK seek advice from their GP for IBS[4,5] and around 20% of these will be referred on to secondary gastroenterology care and 9% for surgical intervention, which constitutes a significant health care cost.[3] Indeed, in 2011 an audit of secondary care gastroenterology out patients in two Somerset district hospitals found that 14.3% of patients where being inappropriately referred for investigations: these patients had no red flags, a suspected diagnosis of IBS, were under the age of 45. They were costing in excess of £129,000 per annum in secondary care consultations and investigations. The financial costs can be increased substantially when one considers that 47% of this group had already undergone previous secondary care investigations for IBS symptoms in the 'revolving door' of diagnosis and ineffective treatment.[7]

The 2008 'IBS Costing Report Implementing NICE Guidance' noted that significant savings could be made with a reduction in inappropriate secondary care input and an **increased**

INFO

"RED FLAGS"

Red flag symptoms upon assessment should prompt appropriate referrals for further investigation.

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Marianne Williams is a specialist IBS and allergy dietitian who works for Somerset Partnership NHS Trust. Her focus on innovation has led to the formation of a new professional role within the NHS, the 'Specialist Community Gastroenterology Dietitian', and the creation of the first UK 'Dietetic-Led Primary Care Gastroenterology Clinic'. This award winning service has an over 75% success rate using a range of specialist evidence based dietary interventions for adult patients with IBS and gastrointestinal allergy with over 63% of positive responders using the highly successful Low FODMAP diet. The clinic is potentially saving considerable money for the NHS by preventing non-red flag referrals into secondary care and by providing an effective alternative pathway for both primary and secondary care clinicians.

More than **2.34 million** people in the UK visit their GP for IBS. Of these, about 20% are referred to a gastroenterologist for treatment, and 9% for surgical intervention, incurring high costs for the National Health Service.[3]

focus on diet as a first line treatment option for IBS.[5] Yet, even up to 2007 there seemed to be limited evidence for the involvement of diet in IBS treatment.[8] However, subsequent documents have given more credibility to the dietary approach and in 2010 The British Dietetic Association produced a professional consensus statement into the dietetic management of IBS.[1]

In fact in the UK, we first started to hear about a new revolutionary diet for irritable bowel syndrome (IBS) in 2009 when a team from Guys & St Thomas' NHS Foundation Trust and Kings College London began investigating Australian research into the Low Fermentable Carbohydrate Diet, also known as the 'Low FODMAP Diet'.

Low-FODMAP Research

The diet was developed by a team from Monash University in Melbourne, Australia, and started to gain prominence following publication of research in 2008 showing that dietary fermentable carbohydrates (FODMAPs) did indeed act as symptom triggers in IBS patients.[9] Since then there have been three randomized controlled trials each of which has shown **a clear benefit of using the Low FODMAP diet**.[10–12] and this data, along with three prospective uncontrolled trials[13–15] and two further retrospective trials[16,17], has led to fermentable carbohydrate restriction becoming an important consideration for future national and international guidelines with regard to IBS treatment. Research repeatedly indicates that patients using this diet report a marked improvement in bloating, flatulence, abdominal pain, urgency and altered stool output, with up to 70% of patients reporting benefit.[2] Indeed, in 2010 the Low FODMAP diet was included in the UK British Dietetic Association IBS Guidelines[18] and in 2011 the diet was adopted by the Australian National Therapeutic Guidelines.[19]

INFO

FODMAP

The term 'FODMAP' is simply an acronym created from the list of specific foods that has been found to cause physiological effects in IBS patients, namely **F**ermentable, **O**ligo-saccharides, **D**i-saccharides, **M**ono-saccharides **A**nd **P**olyols.

In 2010 the Low FODMAP diet entered the UK British Dietetic Association IBS Guidelines[18] and in 2011 the diet was adopted by the Australian National Therapeutic Guidelines.[19]

Disaccharides
Lactose

Milk, custard, ice cream and yogurt

Monosaccharides
Free fructose (fructose in excess of glucose)

Apples, pears, mangoes, cherries, watermelon, asparagus, sugar snap peas, honey, high-fructose corn syrup

Oligosaccharides
Fructans, galacto-oligosaccharides

Wheat, barley, rye, onion, leek, white part of spring onion, garlic, shallots, artichokes, beetroot, fennel, peas, chicory, pistachio, cashews, legumes, lentils and chickpeas

Polyols
Sorbitol, mannitol, maltitol, xylitol

Apples, pears, apricots, cherries, nectarines, peaches, plums, watermelon, mushrooms, cauliflower, sugar free chewing gum/ mints/sweets

Data taken from Shepherd SJ, Lomer MCE, Gibson PR, Rome Foundation Working Group: Short-chain carbohydrates and functional gastrointestinal disorders; Am J Gastroenterol; 2013, 108: 707-717

The long-term self-management of symptoms is managed by consuming FODMAP foods to tolerance.

Where are FODMAPs found?

FODMAPs appear in a range of foods including wheat, certain fruit and vegetables and some milk-based products. In Western Europe oligo-saccharides such as 'fructans' and the mono-saccharide, 'fructose', are the most common FODMAPs in the diet, with wheat thought to be the largest contributor of fructans in the UK.[20]

The mechanisms by which these fermentable carbohydrates provoke gut symptoms are due to **two underlying physiological processes:** firstly, these carbohydrates are indigestible and subsequently fermented by the bacteria in the colon which leads to gas production. This gas can alter the luminal environment and cause visceral hypersensitivity in those who are susceptible to gut pain.[11] Secondly, there is an osmotic effect whereby fermentable carbohydrates increase water delivery to the proximal colon leading to altered bowel habit.[21]

Three stages of the low FODMAP diet

Following the diagnosis of a functional bowel disorder within a typical primary care setting, the implementation of the low FODMAP approach can be said to comprise **3 main stages** (see figure 1).

The first involves complete removal of FODMAP-containing foods for a period of 8 weeks under the advice and supervision of a suitably qualified Dietitian, trained in the low FODMAP approach. Prior to this **exclusion phase**, in centres where suitable facilities are available, breath tests may be used to test for the presence of fructose and lactose malabsorption, The results may allow for a less restrictive diet if the FODMAPs fructose and/or lactose are found to be well tolerated.

Following the 8 week exclusion phase, a thorough dietetic review of symptoms and food diaries will guide the **reintroduction phase**. Depending on symptoms, advice will be provided on the appropriate order and quantity of reintroduction of FODMAP-containing foods.

The **long-term self-management** of symptoms is managed by consuming FODMAP foods to tolerance. The ability to empower patients to take control of their own gut symptoms in the long term and the subsequent de-clinicalisation of their condition is viewed as a great advantage of the low FODMAP approach.

Other applications

Research has followed[22] which shows that the diet is not only useful in IBS, but that it could also be helpful in ameliorating the functional gut symptoms in other conditions such as inflammatory bowel disease.[16] Potential benefits in enteral feeding diarrhoea[23,24] and reducing stool frequency in high output ileostomy or in ileal pouch patients, is also reported although more data is required.[25]

Conclusion

While the benefits of this diet are now well documented, the significance of fermentable carbohydrate withdrawal on the health and nutritional status of the patient and whether there are any long term implications is still not clear. Indeed, fermentable carbohydrates help to increase stool bulk, enhance calcium absorption, modulate immune function and help to encourage the growth and functioning of some beneficial microbial groups such

as bifidobacteria. Hence more studies are required in this area.[2] Historically IBS patients have been both expensive and difficult to treat, costing the UK in excess of £45.6 million in 2003.[26] Indeed, IBS patients incur 51% more total costs per year than a non IBS control group.[27] However, the Low FODMAP diet finally gives a viable alternative therapy for this chronic and debilitating condition and should be seriously considered as a treatment option for any intractable IBS patients.

The low-FODMAP approach in practice

Patient presents to GP with suspected functional gastrointestinal disorder (FGID)

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Appropriate investigation and identification of potential 'red flag' symptoms

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Positive diagnosis of FGID eg IBS

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Referral to a FODMAP-trained Dietitian

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Phase 1

8 week FODMAP elimination

Dietitian takes a full patient history & provides advice, support & appropriate literature on the low FODMAP approach

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Phase 2

Reintroduction Phase

Dietitian reviews symptoms and food diaries, providing advice on order of FODMAP reintroduction.

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Phase 3

Long-term self-management of symptoms

Triggers are identified and patient self-manages symptoms long term by consuming FODMAPS to tolerance within normal balanced diet.

REFERENCES

1 McKenzie Y. A., Alder A., Anderson W., Wills A., Goddard L., Gulia P. et al. British Dietetic Association evidence-based guidelines for the dietary management of irritable bowel syndrome in adults. J Hum Nutr Diet. Research Support, Non-U.S. Gov't. 2012 Jun;25(3):260–274

2 Staudacher H. M., Irving P. M., Lomer M. C., Whelan K. Mechanisms and efficacy of dietary FODMAP restriction in IBS. Nat Rev Gastroenterol Hepatol. 2014 Jan 21

3 Thompson W. G. Irritable bowel syndrome in general practice: prevalence, characteristics, and referral. Gut. 2000;46(1):78–82

4 Bellini M. T. C., Costa F., Biagi S., Stasi C., El Punta A., Monicelli P., Mumolo M. G., Ricchiuti A., Bruzzi P., Marchi S. The general practitioners approach to irritable bowel syndrome: From intention to practice. Digestive and Liver Disease. 2005;37(12):934–939

5 NICE. Irritable Bowel Syndrome: Costing report implementing NICE guidance. London February 2008

6 Spiegel B. Is irritable bowel syndrome a diagnosis of exclusion? A survey of primary care providers, gastroenterologists and IBS experts. Am J Gastroenterology. 2010;105(4):848–858

7 Greig E. Audit of gastroenterology outpatients clinic data for May 2011

8 Halpert A., Dalton C. B., Palsson O., Morris C., Hu Y., Bangdiwala S. et al. What patients know about irritable bowel syndrome (IBS) and what they would like to know. National Survey on Patient Educational Needs in IBS and development and validation of the Patient Educational Needs Questionnaire (PEQ). Am J Gastroenterol. [Research Support, Non-U.S. Gov't]. 2007 Sep;102(9):1972–1982

9 Shepherd S. J. P. F, Muir J. G., Gibson P. R. Dietary Triggers of Abdominal Symptoms in Patients with Irritable Bowel Syndrome: Randomized Placebo-Controlled Evidence. Clinical Gastroenterology and Hepatology. 2008;6(7):765–771

10 Staudacher H. M., Lomer M. C., Anderson J. L., Barrett J. S., Muir J. G., Irving P. M. et al. Fermentable carbohydrate restriction reduces luminal bifidobacteria and gastrointestinal symptoms in patients with irritable bowel syndrome. The Journal of nutrition. [Randomized Controlled Trial Research Support, Non-U.S. Gov't]. 2012 Aug;142(8):1510–1518

11 Ong D.K. M. S., Barrett J. S., Shepherd S. J., Irving P. M., Biesiekierski J. R., Smith S., Gibson P. R., Muir J. G. Manipulation of dietary short chain carbohydrates alters the pattern of gas production and genesis of symptoms in irritable bowel syndrome. Journal of gastroenterology and hepatology. 2010;25(8):1366–1373

12 Halmos E. P., Power V. A., Shepherd S. J., Gibson P. R., Muir J. G. A diet low in FODMAPs reduces symptoms of irritable bowel syndrome. Gastroenterology. [Randomized Controlled Trial Research Support, Non-U.S. Gov't]. 2014 Jan;146(1):67–75 e5

13 de Roest R. H., Dobbs B. R., Chapman B. A., Batman B., O'Brien L. A., Leeper J. A. et al. The low FODMAP diet improves gastrointestinal symptoms in patients with irritable bowel syndrome: a prospective study. Int J Clin Pract. [Evaluation Studies Observational Study]. 2013 Sep;67(9):895–903

14 Mazzawi T., Hausken T., Gundersend D., El-Salhy M. Effects of dietary guidance on the symptoms, quality of life and habitual dietary intake of patients with irritiable bowel syndrome. Mol Med Rep. 2013;8:845–852

15 Wilder-Smith C., Materna A., Wermelinger C., Schuler J. Fructose and lactose intolerance and malabsorption testing: the relationship with symptoms in functional gastrointestinal disorders. Aliment Pharmacol Ther. 2013;37:1074–1083

16 Gearry R., Irving P. M., Barrett J. S., Nathan D. M., Shepherd S. J., Gibson P. R. Reduction of dietary poorly absorbed short-chain carbohydrates (FODMAPs) improves abdominal symptoms in patients with inflammatory bowel disease - a pilot study. Journal of Crohns and Colitis. 2009;3(1):8–14

17 Ostgaard H., Hausken T., Gundersend D., El-Salhy M. Diet and effects of diet management on quality of life and symptoms in patients with irritable bowel syndrome. Mol Med Rep. 2012;5:1382–1390

18 British Dietetic Association. UK evidence-based practice guidelines for the dietetic management of irritable bowel syndrome (IBS) in adults. Birmingham September 2010

19 Government NSW, Australia. Therapeutic Diet Specifications for Adult Inpatients. Chatswood, New South Wales, Australia: Agency for Clinical Innovation; 2011

20 Gibson P. R., Shepherd S. J. Evidence-based dietary management of functional gastrointestinal symptoms: The FODMAP approach. Journal of gastroenterology and hepatology. [Research Support, Non-U.S. Gov't Review]. 2010 Feb;25(2):252–258

21 Barrett J. S., Gearry R. B., Muir J. G., Irving P. M., Rose R., Rosella O. et al. Dietary poorly absorbed, short-chain carbohydrates increase delivery of water and fermentable substrates to the proximal colon. Alimentary pharmacology & therapeutics. [Randomized Controlled Trial Research Support, Non-U.S. Gov't]. 2010 Apr;31(8):874–882

22 Staudacher H. M., Whelan K., Irving P. M., Lomer M. C. Comparison of symptom response following advice for a diet low in fermentable carbohydrates (FODMAPs) versus standard dietary advice in patients with irritable bowel syndrome. J Hum Nutr Diet. [Comparative Study Research Support, Non-U.S. Gov't]. 2011 Oct;24(5):487–495

23 Barrett J. S., Shepherd S. J., Gibson P. R. Strategies to Manage Gastrointestinal Symptoms Complicating Enteral Feeding. Journal of Parenteral & Enteral Nutrition. 2009;33(1):21–26

24 Halmos E. P. M. J., Barrett J. S., Deng M., Shepherd S. J., Gibson P.R. Diarrhoea during enteral nutrition is predicted by the poorly absorbed short-chain carbohydrates (FODMAP) content of the formula. Aliment Pharmacol Ther. 2010;32(7):925–933

25 Croagh C., Shepherd S. J., Berryman M., Muir J. G., Gibson P. R. Pilot study on the effect of reducing dietary FODMAP intake on bowel function in patients without a colon. Inflammatory bowel diseases. [Research Support, Non-U.S. Gov't]. 2007 Dec;13(12):1522–1528

26 Longstreth G. F., Thompson W. G., Chey W. D., Houghton L. A., Mearin F., Spiller R. C. Functional bowel disorders. Gastroenterology. [Review]. 2006 Apr;130(5):1480–1491

27 Maxion-Bergemann S. T. F., Abel F., Bergemann R. Costs of irritable bowel syndrome in the UK and US. Pharmacoeconomics. 2006;24(1):21–37

The low FODMAP diet in practice

The following case study is based on a generic patient using epidemiological data and the following references and any similarity to individual cases is purely coincidental.

Mrs Smith is 46 and in 1997 had an episode of traveller's diarrhoea whilst on holiday; she was referred by her GP to the gastroenterologist for investigation in 1998 after presenting with weight loss, diarrhoea and abdominal pain. Her tissue transglutaminase (IgA tTG) coeliac screen was negative and small bowel biopsy was normal whilst consuming at least 6 weeks of a gluten containing diet, she had no bowel infection or parasitic infestation. Her inflammatory markers and faecal calprotectin test (showing bowel inflammation), which were tested more recently, were normal. Her colonoscopy, SeHCAT test, faecal elastase and lactose breath test were also normal. She has no history of eczema, asthma or atopy and had no previous abdominal surgery.

She was discharged to primary care after extensive work up with a **diagnosis of IBS-D** and prescribed Loperamide Hydrochloride and Mebeverine Hydrochloride for symptomatic control, she used these occasionally. She is a frequent user of primary care services and found the process of reaching a diagnosis caused anxiety at the time and was both frustrating and unhelpful for her.

On her last visit to her GP she informed her that she had tried the **Low FODMAP diet** after researching it on the internet and whilst she felt her symptoms had improved to a small degree, the information she downloaded on the diet was often inconsistent and confusing. She therefore requested a referral to a FODMAP trained dietitian to try the diet in a more systematic manner. On initial assessment Mrs Smith was given an explanation of IBS-D as a functional gut disorder and the

The Bristol stool scale

	Bristol stool types
Type 1	Separate hard lumps, like nuts (hard to pass)
Type 2	Sausage-shaped but lumpy
Type 3	Like a sausage but with cracks on the surface
Type 4	Like a sausage or snake, smooth and soft
Type 5	Soft blobs with clear-cut edges
Type 6	Fluffy pieces with ragged edges, a mushy stool
Type 7	Watery, no solid pieces. Entirely liquid.

JULIE THOMPSON

is a HCPC Clinical Lead Dietitian working in the NHS and private practice. She has an interest in gastroenterology and has experience in treatment of food intolerances and dietary treatment of conditions such as irritable bowel syndrome (IBS), Crohn's disease, colitis and coeliac disease. She is an executive on the board of The IBS Network, the UK charity for people with IBS and has experience in treatment of irritable bowel syndrome with diet, including being trained to use The Low FODMAP dietary approach to reduce functional bowel symptoms. She has written for the Guardian, Sainsbury's Magazine, Network Health Dietitians Magazine and GUT Reaction.

Patient symptom record

Symptom	On initial assessment	On review
Abdominal Pain	Severe	None
Bloating	Severe	None
Flatulence/wind	Severe	Mild
Urgency to open bowels	Moderate	None
Incomplete evacuation	None	None
Abdominal gurgling	Moderate	None
Acid Regurgitation	Moderate	None
Belching or burping	None	None
Nausea	None	None
Tiredness	Severe	Mild
Overall symptom score	Severe	None
Stool form (Bristol)	Type 6 (occasional type 7)	Type 3-4
Frequency	Bowels open 3-6 times per day	Bowels open 1 per day

role of gastroenterology and the Rome III criteria in the positive diagnosis of IBS and asked if she was happy to discuss her symptoms. Her symptoms were assessed using a symptom assessment tool based on the gastrointestinal symptom rating scale (GSRS, Svedlund et al., 1988), the Bristol stool chart and a global symptom question (see symptom chart) her current medical, family and social history were queried; weight, weight history, diet and any foods avoided were also queried and discussed. She was prescribed 2 months exclusion of high FODMAP foods except lactose, which was not problematic.

On review she reported it took approximately six weeks for her symptoms to improve significantly and she was following the diet well. Initially she was reluctant to go ahead with re-introduction as she had satisfactory symptom relief, but decided to when it was explained that it might not be all FODMAP containing foods that would result in symptoms and having more variety would be helpful to manage her diet. After the re-introduction process she found fructans and fructose problematic and was excluding these foods from her diet, but her diet was otherwise varied and nutritionally balanced and she was ultimately discharged from care.

REFERENCES

- Canavan C., West J., Card T. (2014) The Epidemiology of Irritable Bowel Syndrome. Clinical Epidemiology 2014;6:71–80
- Staudacher H. M., Whelan K., Irving P. M., Lomer M. C. E. (2011) Comparison of symptom response following advice for a diet low in fermentable carbohydrates (FODMAPs) versus standard dietary advice in patients with irritable bowel syndrome. Journal of Human Nutrition & Dietetics
- Mackenzie et al. (2012) British Dietetic Association evidence-based guidelines for dietary treatment of Irritable Bowel syndrome in Adults. Journal of Human Nutrition & Dietetics
- Svedlund J., Sjodin I., Dotevall G. (1988) GSRS – a clinical rating scale for gastrointestinal symptoms in patients with irritable bowel syndrome and peptic ulcer disease. Dig Dis Sci. 1988;33:129–134

Useful FODMAP resources

Australian researchers have pioneered the evidence for managing symptoms of IBS using the low-FODMAP approach. Here are a number of supportive resources for healthcare professionals.

THE MONASH UNIVERSITY LOW FODMAP DIET

The research team at Monash University developed the low-FODMAP diet to control gastro-intestinal symptoms associated with Irritable Bowel Syndrome (IBS). The Monash University website provides a wealth of information about the low-FODMAP diet including education and training, public lectures, resources, research and recipe books.

→ **www.med.monash.edu/cecs/gastro/fodmap/**

MONASH UNIVERSITY LOW-FODMAP APP

Researchers at Monash University have developed a low-FODMAP app to assist dietitians and patients with dietary management of the low-FODMAP diet. The app which is available on iPhone and Android includes the following:

- Background information about FODMAPs
- A food guide detailing the FODMAP content for hundreds of foods
- A full recipe book including 79 original and nutritious recipes with professional photography
- A shopping list for organising low FODMAP purchases
- A one week challenge to trial and monitor a strict FODMAP diet, with the function to view detailed graphs of symptoms and the end of the week

→ **www.med.monash.edu/cecs/gastro/fodmap/app-faq.html**
→ iPhone: **www.itunes.apple.com/gb/app/monash-university-low-fodmap/id586149216?mt=8**
→ Android: **www.play.google.com/store/apps/details?id=com.monashuniversity.fodmap**

KINGS COLLEGE LONDON

Comprehensive courses for dietitians on how to deliver and implement the low FODMAP diet are available at Kings College London. Delegates gain sound understanding of the evidence and the courses use a variety of teaching methods including case studies, problem-centred learning, role play and formal lectures. Low FODMAP written dietary resources based on current FODMAP research relevant to the UK food supply with user friendly colour coding are available for any registered dietitian to purchase. Further information about KCL FODMAPs research, education and clinical practice is available at:

→ **www.kcl.ac.uk/fodmaps**

Forum
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News

IMPORTANT INFORMATION regarding Glutafin starter cards!

Due to changes to the Royal Mail free-post system, Glutafin have updated the freepost information on their patient starter cards, used to request hamper boxes for newly diagnosed coeliac patients (new cards now include a barcode that will be used by Royal Mail). In order to ensure that all starter card hamper requests are received and fulfilled promptly, please destroy all old versions of Glutafin starter cards that you may currently have and request new stock as soon as possible. Please call our customer services team on **0800 988 8470** or email **professionals@drschaer.com** and we will be happy to post you a supply of new starter cards free of charge.

New Glutafin Fibre Pasta

Glutafin Gluten Free Foods have launched two new products available on prescription to patients diagnosed with coeliac disease. Glutafin Gluten Free Pasta Fibre Fusilli, PIP code 386-2646 and Glutafin Gluten Free Pasta Fibre Spaghetti, PIP code 386-2653. Glutafin pasta comes in different varieties and is gluten, wheat and lactose free. For more information on our product range please visit the Glutafin website **www.glutafin.co.uk** or email us at **glutenfree@glutafin.co.uk**.

Recent studies on www.drschaer-institute.com

As a healthcare professional it's important to stay up to date with the most recent developments and findings in your area of expertise. The Dr. Schär Institute Website "Clinical Library" feature links to some of the latest research articles regarding coeliac disease, gluten sensitivity and gluten-free nutrition. Recently added abstracts include:

INFO

DS-GLUTEN FREE PRODUCTS

suitable for a low-FODMAP diet include ciabatta rolls, pizza bases, crispbread, pastry, pretzels, and pasta

STUDIES

- → Serological Assessment for Celiac Disease in IgA Deficient Adults
- → Persistent Mucosal Damage and risk of fracture in celiac disease
- → Incidence and Prevalence of Celiac Disease and Dermatitis Herpetiformis in the UK Over Two Decades: Population-Based Study
- → Follow-up of pediatric celiac disease: value of antibodies in predicting mucosal healing, a prospective cohort study
- → Psyllium as a substitute for gluten in pastas
- → Celiac Disease or Non-Celiac Gluten Sensitivity? An Approach to Clinical Differential Diagnosis
- → Characterization of Adults With a Self-Diagnosis of Nonceliac Gluten Sensitivity
- → A Diet Low in FODMAPs Reduces Symptoms of Irritable Bowel Syndrome
- → Effect of gluten free diet on immune response to gliadin in patients with non-celiac gluten sensitivity

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