Food intolerances and bowel symptoms in Chronic Fatigue Syndrome

Melanie Reid
Accredited Practising Dietitian
Victor Harbor
28th April 2012
Outline

• How the large bowel works
• Bowel symptoms
• First things first
• Food intolerances
  – The low FODMAP diet
  – Food chemical intolerances
The workings of the large bowel

- A major function of the large bowel is to dry out the material that enters it
- The rectum is a storage device
- It provides us with ‘bacterial services’
  - 100 trillion bacteria
  - 500 – 1000 species (30 - 40 predominate)
  - produce vitamin K, biotin & other important substances eg butyrate
  - ‘train’ the immune system
Let’s talk about texture!

<table>
<thead>
<tr>
<th>Bristol Stool Form Scale</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Hard</strong></td>
</tr>
<tr>
<td>Type 1</td>
</tr>
<tr>
<td>Separate hard lumps, like nuts</td>
</tr>
<tr>
<td>Type 2</td>
</tr>
<tr>
<td>Sausage-like but lumpy</td>
</tr>
<tr>
<td><strong>Normal</strong></td>
</tr>
<tr>
<td>Type 3</td>
</tr>
<tr>
<td>Like a sausage but with cracks in the surface</td>
</tr>
<tr>
<td>Type 4</td>
</tr>
<tr>
<td>Like a sausage or snake, smooth and soft</td>
</tr>
<tr>
<td>Type 5</td>
</tr>
<tr>
<td>Soft blobs with clear-cut edges</td>
</tr>
<tr>
<td><strong>Loose</strong></td>
</tr>
<tr>
<td>Type 6</td>
</tr>
<tr>
<td>Fluffy pieces with ragged edges, a mushy stool</td>
</tr>
<tr>
<td>Type 7</td>
</tr>
<tr>
<td>Watery, no solid pieces</td>
</tr>
</tbody>
</table>
Let’s talk about texture!

• Stool texture affected by content of water, fibre and dead bacteria
• Water content can be affected by
  - transit time (time taken for contents to move from beginning to end of large bowel)
  - amount of liquid entering the large bowel
  - ability of gut wall to absorb water
Factors affecting transit time

• Enteric nervous system (ENS) controls rhythmic squeezing of gut (peristalsis)

• Some people naturally tend to have a long transit time e.g. bowel pattern of 5 firm stools per week

• Others naturally have shorter transit time e.g. 2-3 soft stools per day
Factors affecting transit time

• Nature of bowel contents
e.g. small volume due to low fibre diet
   → less distension and weaker signals to bowel to move things through

• Stress
   (affect on nerve control of gut movement)

• Influence of drugs on ENS e.g. codeine, morphine, oxycodone make it sluggish

• Age and mobility
Liquid entering the bowel

Large amount of poorly absorbed sugars (FODMAPs) will draw more fluid into bowel

(more about FODMAPs later!)
Ability to absorb fluid

Gut infection or other causes of inflammation of bowel lining will reduce capacity of bowel to absorb water
Diarrhoea

Can be due to:

• Too much liquid coming from small intestine (e.g. FODMAPs)
• Impaired ability of bowel to absorb water (e.g. colon inflamed)
• Transit time too fast
Constipation

Can be caused by:

• Contents moving too slowly through the bowel and drying out too much
• Not obeying call of nature
• Dehydration – body responds by increasing the amount of salts and water we absorb from the bowel
Let’s talk about wind & bloating!

• Bacteria produce gas when they ferment fibres and sugars in the large bowel
• Variety of gases eg hydrogen, methane, hydrogen sulphide – partly depends on types of bacteria in gut
• Wind is normal - we make enough to fill an ave balloon every day. Some make more!
• Most people break wind 6 -12 times/ day
Let’s talk about wind & bloating!

• Excess wind can cause bloating and pain (and embarrassment). Can be a problem with poorly absorbed sugars.

• Bowel lining has nerve endings that are sensitive to stretch (distension). Some people have a more sensitive gut and will get pain with even modest distension. Food chemical intolerance can affect a sensitive gut.
Bowel pain

• Pain from the large bowel can also be caused by spasm in the muscle lining
• Food chemical intolerance is sometimes involved
ME/CFS and the bowel

• 80% of people with ME/CFS report bowel symptoms like Irritable Bowel Syndrome (IBS) – pain, bloating, constipation and/or diarrhoea

• Research indicates frequent disturbance in types and proportions of bowel bacteria
Treatment: First things first

- Exclude serious medical conditions eg cancer, coeliac disease, inflammatory bowel disease
- Try simple dietary measures first:
  - Fibre and fluid
  - Fat
  - Caffeine
  - Alcohol
Complex things next

If simple measure don’t help, consider:

• Probiotics (but which one?)
  Or

• Food intolerances
  – Coeliac disease (gluten intolerance)
  – FODMAPs
  – Food chemical intolerance
Fibre: a double-edged sword

• Fibre is like a sponge that absorbs water (can help ‘normalise’ bowel motions)
• Fibre feeds bowel bacteria
• Fibre is fermentable (can increase gas & bloating)
• It may be worth trying a change in amount and type of fibre (soluble fibre often better tolerated than insoluble fibre)
• If increasing fibre, do it gradually and with adequate fluid intake
Fat

- In some people, fat will increase the gastro-colonic response
- Some people may not absorb fat very well
- Fat can also slow down gastric emptying
- May be worth trying reducing fat intake
Caffeine

• Caffeinated coffee shown to stimulate large bowel activity
• If your caffeine intake is high, it might be worth cutting back
Alcohol

- Is a bowel stimulant
- May contribute to abdominal discomfort
- It might be worth reducing intake
- Most people with CFS don’t tolerate alcohol very well anyway
Probiotic supplements

• Gut symptoms can be caused by changes in bowel bacteria e.g.
  – small bowel bacterial overgrowth
  – changes in types and proportions of bacteria in large bowel (common in ME/CFS)

• Some theories that nasty bacterial toxins play a causal role in CFS

• May be a role for probiotics, but more research needed
Food Intolerances

Ut quod ali cibus est aliis fuat acre venenum. What is food to one, is to others bitter poison

Titus Lucretius Carus (99–55 BC)
Coeliac disease

- Gluten intolerance (gluten damages lining of small intestine) → poor digestion and absorption of nutrients
- Symptoms can include diarrhoea
- About 1% of population (75% undiagnosed)
- Treatment is strict life-long gluten-free diet (foods containing wheat, barley, rye, oats)
- May not develop or be diagnosed until later in life. Screening blood tests can be done.
FODMAPs

- **F**ermentable
- **O**ligo
- **D**i and
- **M**ono saccharides
- **A**nd
- **P**olyols
• Fermentable
• Oligo: fructans and GOS (galacto-oligo-saccharides)
• Di: lactose
• Mono: fructose
• And
• Polyols: sugar alcohols e.g. sorbitol, xylitol, mannitol
How do FODMAPs cause symptoms?

• Poorly-absorbed sugars enter large bowel in large quantities
• They have an osmotic effect: draw more fluid into large bowel → diarrhoea
• Fermentation of sugars by bowel bacteria gas → bloating
• Distension in hypersensitive bowel → pain
How do FODMAPs cause symptoms?

- Some people produce excessive methane may slow down gut transit time → constipation (this depends on individual’s gut bacteria)
FODMAPs - Lactose

- Lactose intolerance is caused by lack of lactase enzyme in small intestine
- Not that common in Caucasians, but affects many people of Asians, African or Aboriginal backgrounds
- Without lactase, lactose can’t be broken down and is unabsorbed
- Small amounts may be tolerated (eg 1 cup milk over the day)
FODMAPs - fructose

- About 30-40% of people have poor absorption of fructose
- Might be higher rates in people with ME/CFS
- Some, but not all, will get symptoms
FODMAPs - fructose

Problem foods
- High ratio of fructose to glucose
- High overall load of fructose

- Apples, pears
- Watermelon, mango
- Fruit juice, dried fruit, fruit platters
- Sugar snap peas
- Tomato concentrates
FODMAPs - fructose

Problem foods (cont)

- Honey
- High fructose corn syrup
- Alternative sweeteners
  – Sweetaddin and Fruisana
FODMAPs - fructose

- Fruits with high glucose to fructose ratio are better tolerated e.g. oranges, bananas
- Cane sugar (sucrose) is ok in small amounts (half glucose, half fructose)
FODMAPs - fructans

- Long chain of fructose units
  F-F-F-F-F-F-F-G
  Humans cannot break this down
- < 10 units: fructo-oligo-saccharides (FOS)
- > 10 units: inulin
FODMAPs - fructans

Food sources

- Wheat, rye
- Onions, spring onions, shallots, garlic
- Leeks, artichokes
- Cabbage, Brussels sprouts
- Legumes
- Chicory root (in coffee substitutes)
- Inulin as an additive (this is in a lot of yoghurts, and some fibre supplements eg Metamucil Fibresure)
FODMAPs - GOS

• Galacto-oligo-saccharides (raffinose & stachyose)

• Humans cannot break these down

• Common dietary sources:
  – Dried beans e.g. kidney beans, baked beans
  – Lentils
  – Dried peas e.g. chickpeas
FODMAPs - polyols

- Sugar alcohols e.g. sorbitol, xylitol, mannitol, isomalt
- Poorly absorbed from small intestine (less than 20% absorbed)
FODMAPs - polyols

Common food sources:

• Artificially-sweetened products
  – Sugar free gum, mints, confectionery

• Some fruits and veg
  – Apples, pears
  – Stone fruit (apricots, peaches, nectarines, plums, cherries)
  – Avocado
  – Mushrooms, cauliflower, snowpeas
Low FODMAP test diet

• All poorly-absorbed sugars are possible symptom triggers (varies from person to person)

• Trial low FODMAP for 6-8 weeks to see if there’s improvement

• If symptoms improve, challenge individual FODMAPs, or just find tolerance level
Food Chemical Intolerance

A drug-like reaction to food chemicals which irritate nerve endings
Food Chemical Intolerance

- Symptoms can include diarrhoea, constipation, bloating, gas and pain
- Other symptoms can include:
  - skin rashes
  - migraines and other headaches
  - sinus problems
  - asthma/ wheeze, chronic cough
  - joint and muscle pain
  - mouth ulcers
Possible Symptoms

**Respiratory**
- Sinusitis
- Hayfever
- Asthma, wheeze
- Congestion
- Chronic cough

**Central Nervous System**
- Migraine and other headaches
- Fatigue
- Irritability, “behaviour problems”
- Irritable bladder
- Muscle & joint pain

**GIT**
- Recurrent mouth ulcers
- Nausea, vomiting
- Reflux
- Abdominal pain
- IBS-type symptoms
- Diarrhoea

**Skin**
- Hives
- Swelling/Angioedema
- Eczema
- Itching
Provoking substances

Natural food chemicals

• Salicylates
• Amines
• Glutamates
• Sometimes milk, wheat and soy
Provoking substances

Food Additives

• Flavour Enhancers
  MSG, other glutamates and ribonucleotides

• Preservatives
  benzoates, sorbates, sulphites, propionates, nitrates/nitrites

• Synthetic antioxidants

• Colours
  artificial and natural (eg annatto, cochineal)

• Flavours
How common is it?

- Probably 5 -10 % of population have noticeable reactions
- May be much more common in people with ME/CFS
Mechanism?

- Genetic pre-disposition
- May have lower level of enzymes that degrade food chemicals
e.g. mono-amine and di-amine oxidases, sulphur transferases
- Direct effect on nerve endings?
  (for gut, this could cause visceral hypersensitivity, change in peristalsis)
It can be hard to pin down

- Can react to more than one chemical
- Each chemical is found in many foods
- Reactions are dose-related: only occur after threshold has been reached
- This threshold can change - depends on “Total Body Load” of stressors
- Reactions can be delayed or take days to build
Reactions are dose related, and depend on threshold being reached.

Effect of one very large dose
e.g. migraine after binge on chocolate

Build-up over time with many small doses
e.g. hives after eating more fruit over summer

 Courtesy RPAH Allergy Unit
Each chemical is found in many foods, and all contribute to the total dose.

Example of a build-up of amine level until it reaches reaction threshold.
Multifactorial Influences on “Total Body Load”

NERVOUS SYSTEM

- Food
- Drugs
- Smells and chemical exposures
- GENETIC PREDISPOSITION
- Hormones
- Infection, allergy, illness
- Stress e.g. physical, medical, emotional, mental

Courtesy RPAH Allergy Unit
Investigating food chemical intolerance

- Not an immune mechanism - can’t be diagnosed by skin prick tests or blood tests
- Check response to elimination diet (3-6 wks)
- If good response, identify culprit chemicals with series of food challenges (can take a few months)
- Needs to be done under supervision of experienced dietitian!
Foods high in salicylate

- **Fruit:** most strong flavoured or tart fruit e.g. citrus, berries, stone fruit, apples, grapes
- **Vegetables:** many vegetables e.g. broccoli, capsicum, cauliflower, egg plant, mushrooms, olives, spinach, tomato, zucchini
- **Nuts & seeds**
- **Herbs, spices, vinegar, honey**
- **Wine, cider and beer**
Foods high in amines

• Vegetables e.g. broad beans, egg plant, spinach, tomato and tomato products, mushroom and olives

• Fruit e.g. avocado, bananas, berries, citrus fruits, grapes, kiwifruit and pineapple

• Cheese

• Tinned and frozen fish, aged meats

• Alcohol – wine and beer

• Chocolate
Foods high in glutamates

- Vegetables e.g. tomatoes, mushrooms, spinach
- Fruit e.g. grapes, plums
- Strong cheeses e.g. Parmesan, Brie, Blue vein
- Meat products e.g. salami, meat and fish pastes
- Savoury flavours e.g. sauces, gravy, stock, vegemite
- Alcohol e.g. beer, wine
- Foods with additive numbers 620-625 e.g. savoury snack foods, two minute noodles, savoury biscuits
Sorbates

- Code numbers 200-203
- Inhibit growth of yeasts and moulds
- Found in cheese products, margarines, dips, juices, soft drinks and cordials, some dried fruit e.g. prunes
Benzoates

- Code numbers 210-218
- Inhibits growth of yeasts and moulds
- Added to cordials, soft drinks, fruit drinks and fruit products
Sulphates / sulphites

• Code numbers 220-228
• Prevents browning, inhibits growth of undesirable yeasts in wine
• Found in dried fruit, meat products, prawns, cordials, soft drinks, salad dressings, pickles and wine
Nitrates/ nitrites

• Code numbers 249-252
• Curing agent, adds colour and flavour to foods
• Inhibits growth of *Clostridium botulinum*
• Found in processed meats
Propionates

- Code numbers 280-283
- Inhibits growth of mould
- Found in bread and baked goods
Synthetic anti-oxidants

- Code numbers 310-321
- Inhibit rancidity in foods
- Found in oils and high fat foods
Colours

• Give colour to processed food, drinks and medications
• Found in a many foods e.g. lollies, cordial and soft drinks, desserts, cakes, biscuits, savoury snacks, gravy powder, sauces, ice cream
• Includes artificial colours & annatto (160b)
Flavours

- Thousands of flavour compounds used in foods
- Don’t have code numbers
- Approx 10 times the dose of colours
FODMAPs resources

• Dr Sue Shepherd and team at Box Hill Hospital/ Monash Uni, Victoria

• Low FODMAP Diet Booklet Order Form
  http://www.med.monash.edu/ehcs/research/index.html
Food chemical resources


For further information

Contact:
Mel Reid, Senior Dietitian
Southern Fleurieu Health Service
Harbour View Terrace
Victor Harbor  SA  5211
Ph 08 8552 0600
Email: mel.reid@health.sa.gov.au