Dietary advice for short bowel patients with a jejuno-colic anastomosis

What is short bowel?

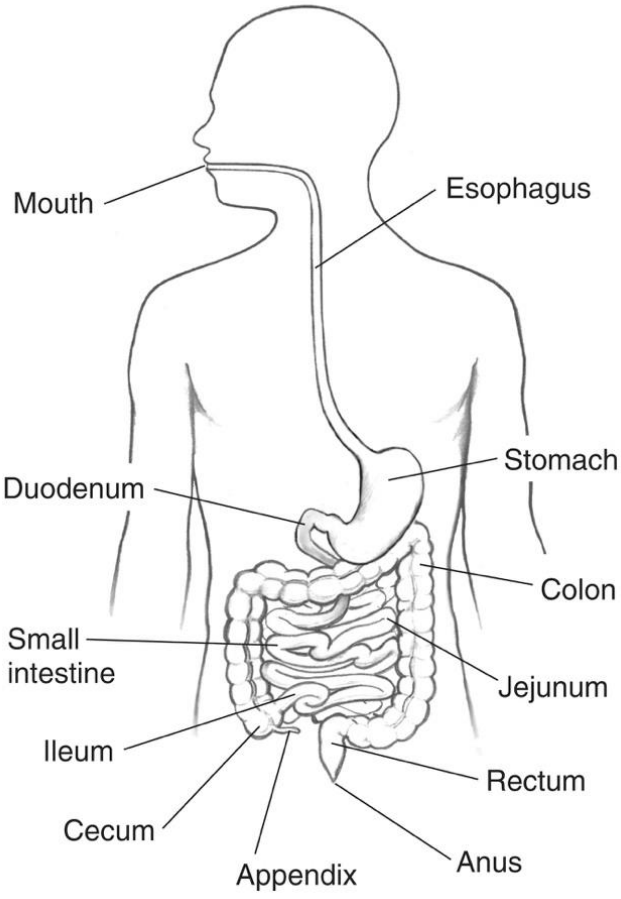
Short bowel is a rare condition whereby;

1. The small bowel (part of the gut) is unable to digest and absorb the correct amount of nutrients.

2. The body does not reabsorb fluids, including digestive juices, produced by the bowel.

This can lead to problems such as malnutrition, weight loss, diarrhoea and dehydration.

To understand why this happens, it is helpful to know what happens in a person without short bowel.



The digestive process

Digestion is the process of the food you eat being broken down into small nutrients. These nutrients are then absorbed by the bowel and go into the bloodstream to feed the body.

Mouth and stomach

Digestion begins in the mouth, which is why it is important that you chew your food thoroughly. When this food reaches the stomach, it is churned into a liquid by acid produced in your stomach.

Small bowel

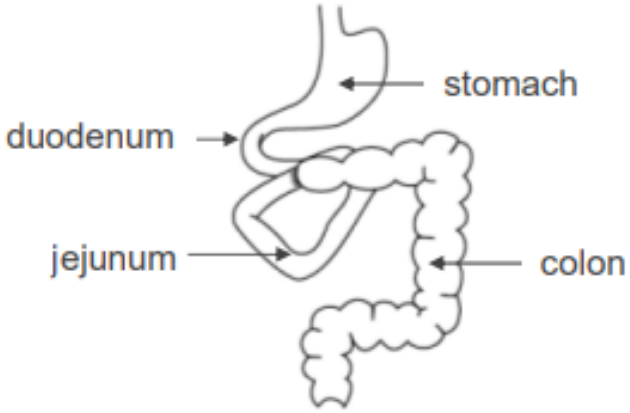
The small bowel is where most of the digestion of food and the absorption of nutrients into the body occurs. To aid digestion, about four litres of 'digestive juices' are made and released by the small bowel each day. Most digestion occurs in the first part of the small bowel called the duodenum. Once digested, most nutrients are absorbed in the second part of the bowel called the jejunum. In the third part of the small bowel, the ileum, most of the juices that are released to aid digestion are re-absorbed. Vitamin B12 is also absorbed in the ileum.

Large bowel / colon

The remaining fluid that has not been absorbed will pass into the large bowel, also known as the colon, which reabsorbs water and sodium to form a stool.

What is a jejuno-colic anastomosis?

Jejuno-colic anastomosis happens when the ileum (the last part of the small bowel, which connects to the large bowel) is removed during surgery. The jejunum (the middle part of the small bowel) is joined to the large bowel instead. The picture below shows how this might look.



When you have had a large part of your small bowel removed, the length left behind may not be enough for all the fluids and nutrients to be absorbed. This is often referred to as having a 'short bowel'. This can lead to weight loss or dehydration; however, your colon (large bowel) will work to:

- Reabsorbs fluid and salt
- Slows the movement of food through the bowel allowing more time for nutrition to be absorbed
- Absorbs energy from the breakdown of starchy foods in the colon

This diet sheet aims to help you change the way you eat and drink to prevent dehydration, unintentional weight loss, kidney stones, and nutritional deficiencies.

The first four to six weeks after surgery

Lower fibre diet

For the first four to six weeks after your surgery, you will need to follow a low fibre diet. These foods are easier to digest when your bowel is healing.

See appendix 1 for suitable low fibre foods, and then high fibre foods to avoid.

After four to six weeks

After four to six weeks, you can gradually introduce higher fibre foods into your diet. You should only start this process once your bowel motions are formed. Monitor your bowel patterns when you are introducing higher fibre foods.

Longer-term dietary changes to consider

When part of the small bowel is removed, your body may not absorb all the nutrition you take on. Therefore, you may need to eat more food than you expect in order to help ensure your body's nutritional needs are being met. High fibre foods may also need to be limited in the longer term.

It is recommended that your long-term diet is:

- Moderate in fat
- High in carbohydrates
- High in protein
- Low in oxalate (to help prevent kidney stones)
- Moderate in calcium (to help prevent kidney stones)

Fat

Fat is a good source of energy. However, you may have difficulty absorbing fat because the ileum (part of your small bowel), which is important for fat absorption, has been removed.

You may need to reduce your fat intake if you experience:

- loose or runny stools
- stools which are pale in colour
- oily stools
- stools that float on the surface of the toilet and are difficult to flush away

If you are concerned about your stools, please speak to your Intestinal Failure Dietitian. You may need medication to help with your symptoms.

How to reduce your fat intake

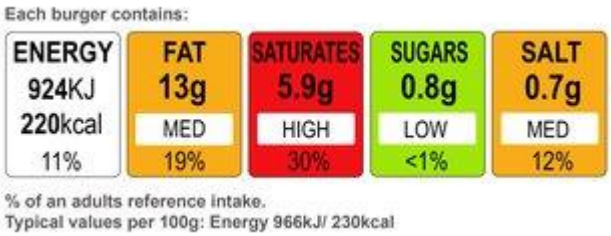
Below are some ways you can reduce your fat intake:

- Use a low-fat spread instead of butter or margarine (and spread thinly)
- Use semi-skimmed milk rather than whole milk

- Choose half-fat hard cheese instead of full-fat varieties. If you decide to eat full-fat cheese, have a smaller portion
- Choose low-fat cottage cheese or low-fat soft cheese instead of regular varieties
- Choose coconut milk, coconut cream and coconut yoghurt (the type of fat found in coconut products can be absorbed well by your large bowel)
- Choose low-fat yoghurt, salad cream, mayonnaise and dressings
- Limit takeaways, chocolate, pastries and cream
- Limit crisps, cakes and biscuits, or choose lower fat options such as jaffa cakes or baked/ popped crisps
- Buy lean cuts of meat and trim off any visible fat
- If you choose to fry food, use small amounts of cooking oil or use a spray cooking oil. Instead of frying food, try microwaving, oven cooking, steaming, poaching, boiling or grilling

Food labelling (content per 100 grams [g])
You can use food labels to help guide your choices. Foods low in fat will have a green label, and foods high in fat will have a red label. See below for an example:

High fat: Over 17.5g
Medium fat: Between 3g and 17.5g
Low fat: 3g and below



Carbohydrates
Carbohydrates, or starchy foods, are a good source of energy. Your large bowel makes energy by breaking down carbohydrates, so these foods may help you gain or maintain your weight.

Below are some tips for how to increase your carbohydrate intake:
- Include starchy food (such as bread, sourdough, potatoes, rice, noodles, pasta, or cereal) at each meal
- Between meals, snack on starchy foods (such as sandwiches, breakfast cereals, crackers, toast or crumpets)
- To add extra calories, you could try adding a thick spread of jam, marmalade, honey or syrup to bread/toast, or add to milk puddings or porridge (you should discuss this with your team if you have diabetes)

Protein
Eating foods high in protein will help you recover from surgery. It will also help to maintain your weight. You should include a portion of protein at each mealtime, but you may need to cook foods without adding too much extra fat.
Sources of protein include:
• Meat and poultry (such as beef, pork, ham, chicken or turkey)
• Fish
• Eggs
• Milk, dairy products and milky puddings (such as yoghurts, custard and rice pudding)

If you follow a vegan diet, please discuss this with your Intestinal Failure Dietitian.

Oxalate and kidney stones

Kidney stones are more common when your body cannot absorb fat properly. Normally, calcium binds to oxalate in the bowel and is then passed out of the body in the stool. In short bowel syndrome with an intact colon, fat from the food you eat is not absorbed and binds to calcium, leaving the oxalate behind in the colon. The oxalate is then absorbed by the colon and travels to the kidney, where it can form stones. When your body absorbs more oxalate, you have a higher risk of developing kidney stones.

- Avoid foods high in oxalate (see appendix 2)

Reducing risk of developing kidney stones

Below are some tips to reduce your risk of developing kidney stones. You can:

- Limit the amount of fat in your diet. Medium-Chain Triglycerides (MCTs) are a specific type of fat that is absorbed much higher up in the digestive system and can be used to supplement your intake of fat if you are losing weight, whilst keeping your risk of developing kidney stones low. Please ask your Intestinal Failure Dietitian about this.
- Avoid foods high in oxalate (see appendix 2)
- Increase your citric acid intake
- Limit the vitamin C content of your diet
- Drink enough fluids: The more fluids you drink, the more urine you will make. Passing at least 2.5 litres of urine per day will prevent the build-up of waste chemicals in the urine, which reduces the risk of these chemicals sticking together and forming crystals. Having urine that is paler in colour means there are less waste products and a reduced risk of crystal formation
- Eat enough calcium as this can bind to the oxalate in your bowel

Calcium

Try aiming for 2-3 servings of dairy foods or high calcium foods every day.

A serving of a high calcium food might include:

- One glass of milk
- One single serve pot of yoghurt
- 30g of cheese (2x slices OR 1x matchbox sized piece)
- 1x tin of sardines or 1x fillet mackerel
- Palm-sized piece of tofu

Hydration

You should aim to be well hydrated. Please remember that you may need to drink more fluids in the warm weather or if you are exercising.

The guide below can help you see how hydrated you are. If your urine matches 1 to 3, you are well hydrated. If your urine matches 4 to 8, you may need to drink more.

Vitamins and minerals

B12 injections

After your ileum is removed, you will need vitamin B12 injections every three months for the rest of your life to prevent deficiencies. Please discuss this with you Intestinal Failure Consultant or Intestinal Failure Dietitian.

Supplements

It is important that you talk to your healthcare team before taking any vitamin and mineral supplements. This is because high doses of some vitamins are not recommended. For example, vitamin C is converted to oxalate when it is taken at very high doses. However, if you are prescribed any supplement (such as a balanced multivitamin and mineral supplement or fat-soluble vitamins), you should keep taking these unless your Intestinal Failure Team advises you otherwise.

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Appendix 1: Low fibre foods

	Food to choose	Food to avoid
Fruit	Canned fruit without seeds: Mandarins, peaches, pears and grapefruit Smooth fruit juices or smoothies (no seeds) Stewed or peeled fruit with pips and skin removed: Apples, pears, plums Ripe bananas, ripe peeled pears	Dried fruits: Prunes, berries, raisins, figs Fruit with seeds: Blackberries, kiwi, raspberries, strawberries Fruit with tough skin or stringy parts: Cherries, blueberries, rhubarb, pineapple, cranberries, grapes, apricots, oranges Unripe fruit e.g. green bananas Coconut
Vegetable	Well cooked, peeled vegetables: Parsnips, swede, carrots, sweet potatoes, cauliflower (stalk removed), broccoli (stalk removed), peeled courgette, butternut squash Potatoes without skins	Raw or undercooked vegetables including carrots, celery Salads including lettuce, cucumber, onion, pickles, tomato and coleslaw Vegetables with skins: Sweetcorn, peas, beans/bean sprouts, brussel

	Vegetable juice without pulp Blended soup, tomato sauce, passata sauce, tomato puree Well-cooked red split lentils	sprouts, cabbage, mushrooms, okra, peppers, radish, and spinach Chinese vegetables: Bok choy, bamboo shoots Vegetable juice with pulp Pulses: Baked beans, chickpeas, lentils
Milk and dairy products	Most of these foods are ok – except for foods to avoid	Cottage cheese containing vegetable pieces Yoghurts with fruit/berries/muesli Cheese with seeds, nuts, or fruit Ice cream containing nuts High fat foods containing lots of cream or cheese may not be tolerated
Cereals	Plain rice, corn-based cereals: Cornflakes, rice krispies, instant oats, coco pops	Wholegrain cereals: Bran or wheat-based cereals You may not tolerate porridge but may find that similar finely milled/instant oat cereals are ok Any cereal containing fruit or nuts, e.g. muesli
Meat, fish and Alternatives	Animal products don't contain fibre, however tough meat may not be digested as well. Ensure these are lean, tender and soft Beef, lamb, chicken, fish (no bones), pork, eggs, tofu	Tough meats with gristle and smoked or cured deli meats Fish bones Very fatty/oily meats may not be well tolerated so monitor tolerance
Bread, flour, pasta rice	White bread, rolls, pittas, chapattis, naan bread (made with white flour) White rice, white pasta Cornflour, sago, tapioca and semolina Couscous, polenta, tortillas & tacos Any baked goods made from refined flours (white flour) and allowed ingredients: bagels, biscuits, plain scones, crumpets, bread, buns, crackers, croissants, muffins, pancakes, waffles	Brown, wholemeal and granary bread, rolls, rye bread, pitta, chapattis & naan bread (made with brown or wholemeal flour) Brown rice, brown pasta Any bread or flour products containing seeds, nuts, dried fruit e.g., fruit scones, currant/fruit loaves Pearl barley, quinoa Bread with added seeds, fruit or nuts
Miscellaneous	Seedless, rindless varieties of jam and marmalade	Jams with seeds or peel (marmalade, strawberry, raspberry, blueberry etc.)

	Bovril, Marmite & chocolate spread. Sugar, honey & syrup Ketchup, bottled sauces, vinegar, margarine, butter, oils, mayonnaise, sour cream, smooth sauces, salad dressing, soy sauce Crisps, plain crackers, pretzels, gelatine	Chutneys, pickles, relish, sauerkraut, and horseradish Popcorn. Savoury snacks containing nuts e.g. Bombay mix, trail mix Wholemeal or seeded crackers
Nuts	Small amount of smooth nut butter if tolerated	Avoid all whole nuts or nut pieces
Drinks	Hot chocolate, Ovaltine and Horlicks Flavoured water and squash Milkshakes	Prune juice/Juice with pulp or seeds Caffeine may irritate the bowel – if so, it may be of benefit to try decaf tea and coffee
Desserts	Biscuits and cakes made with white flour Rich tea, shortbread and sponge cake Plain puddings, custard, jelly, semolina, rice pudding Ice cream and ice pops Boiled sweets Chocolate/toffee/fudge (without fruit/nuts)	Biscuits or cakes made with brown or wholemeal flour - digestives, flapjacks, oatcakes, cereal bars Desserts, puddings, biscuits/cookies or pies containing dried fruit, coconut, fruit peel or nuts e.g. mince pies, fruit crumble etc. Chocolate/toffee/fudge with dried fruit, coconut, or nuts

Appendix 2: High Oxalate Foods and Suitable Alternatives

	High in oxalates	Suitable Alternatives
Beverages	Chocolate beverages, including powdered and syrup-based chocolate milkshake, cocoa powder and hot chocolate. Cups of tea including berry flavoured herbal tea, are also high in oxalates	Water, squash, milky/ weak tea or coffee, Bovril, skimmed or semi skimmed milk, Fruit juices (apple, pineapple, grape, grapefruit, cranberry, lemon/lime juice)
Breads and Cereals	Amaranth, buckwheat, all-bran and other high-fibre cereals, kamut, quinoa, spelt, stone-ground flour, wheat bran, wheat germ, whole wheat flour and bread, rice bran, soy flour, muesli	White flour or baked products, e.g. bread, pasta, spaghetti, macaroni, crumpets, English muffins, white rice, plain couscous, noodles, Rice Krispies/ puffed rice cornflakes/ frosted flakes, Special K, Sugar Puffs, Cheerios
Vegetables*	Beetroot, carrots and carrot juice, canned tomato and tomato sauce, dark leafy greens (e.g. spinach, swiss	Asparagus, avocado, cauliflower, cucumber, lettuce, peas, peppers, onions

	chard, kale), aubergine, sugar snap peas/mangetouts, green peppers, okra, parsnips, pumpkin, turnip, watercress, white potatoes, sweet potatoes, yams, potato-based crisps, cassava	*Soaking and cooking certain vegetables in a large pot of boiling water can reduce their oxalate content
Fruits	Figs, kiwi, orange, tangerine, grapefruit, raspberries, strawberries, currants, rhubarb, star fruit, dried fruit (dates, prunes, cranberries, blueberries, currants), canned pineapple	Apples, banana, fresh apricots, cherries, grapefruit, grapes, lemon, melon, nectarines, papaya, passion fruit, peaches, pear, pineapple, strawberries
Legumes, Seeds, and Nuts	Baked beans, legumes (e.g. kidney beans, black beans, cannelloni beans), lentils*, peanuts/peanut butter (and other nuts/nut butters), pumpkin seeds, sunflower seeds, tahini, tofu, pine nuts	*Soaking lentils before cooking can reduce their oxalate content
Desserts	Cakes and desserts including fried fruit or chocolate, for example, chocolate chip cookies, fruitcake or brownies. Limit fudge and chocolate sauce	Tapioca, blancmange, puddings made with skimmed milk, frozen yoghurt, jelly
Other	Soy products such as cheese, yoghurt and soy-protein (vegetarian burgers, hot dogs and deli meats) and tofu products, soy protein isolate, miso, miso soup, stuffing, chili, pizza, lasagne, olives, fudge and chocolate syrup/sauce	Jams, marmalade, honey, syrup, treacle, low fat dressings and sauces – try herbs, spices, vinegar, lemon juice

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