

Physical activity and the ileostomy patient: exploring the challenges of hydration

Abstract

Drinking plenty of fluid is vital for good health, but hydration requirements are more complex for people with an ileostomy, as they have a shorter bowel to absorb fluids and electrolytes with. This becomes an even greater challenge during physical activity and sport, when further fluid is lost through sweat. Therefore, it is important to be aware of the advantages and disadvantages of different drinks, including their osmolality and how much glucose and electrolytes they contain. This article aims to provide information for nurses to be able to confidently support people with an ileostomy to appropriately manage their hydration requirements.

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Drinking plenty of fluid is always vital for good health, but for people who have an ileostomy, it is even more important. The hydration requirements for a person with an ileostomy are greater and more complex than for a person without a stoma, because extra fluid is lost through the ileostomy output (Ng et al, 2013). Optimum hydration becomes an even greater challenge for someone with an ileostomy who engages in sport and physical activity, as further fluid will be lost through sweat during exercise.

So how should stoma care nurses advise these patients? What is the best advice to give to the active ileostomy patient to manage their hydration requirements? Being well hydrated is important for every single biological function of the body; it improves concentration, and it is vital for all aspects of health and wellbeing. However, the majority of the general population do not drink as much fluid as is recommended, and the majority of people with an ileostomy regularly show some signs of dehydration (Ng et al, 2013). Even the initial stages of dehydration can induce fatigue and feelings of being unwell, with headaches and poor concentration, while being well hydrated can improve energy levels, concentration and feelings of wellbeing.

Gastrointestinal absorption

The function of the gastrointestinal tract is to process ingested food and fluid so they can be absorbed by the body. Below the stomach, components of food, fluid and secretions are absorbed, so, by the time the faeces reach the ileocaecal valve, the maximum volume is 1500ml per day (Burch, 2006). The first 100–150cm of small bowel absorbs more than 90% of the nutrients, but it is poor at absorbing fluid, and transit through the jejunum is fast. The ileum has a slower transit time and is much more effective at absorbing electrolytes and fluid than the first part of the small bowel (Medlin, 2012). The colon's primary function is to absorb excess water and electrolytes, transforming semi-liquid stools into firmer formed faeces. Some 90% of water absorption occurs in the small intestine, but the colon absorbs about 1 litre daily, reducing the volume that enters the rectum to approximately 100–200ml. The colon then stores the waste material before evacuation (Burch, 2008). However, the formation of an ileostomy interrupts this process, and it is likely to result in reduced fluid and nutrient absorption along a shorter length of ileum. With regards to hydration, the absorption of water and electrolytes, such as sodium, potassium and magnesium, will be lost in a loose, watery faecal output.

Key words

- Ileostomy
- Osmolality
- Physical activity
- Preventing dehydration
- Sports and exercise

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Table 1. Early signs of dehydration

Dark urine
Headache
Poor concentration
Thirst and dry mouth
Tiredness and fatigue

Fluid concentration in the small bowel

Ideally, the sodium level of the lumen of the jejunum should be maintained at 90mmol/litre (Sica and Burch, 2007). Therefore, hydration is also affected by the choice of fluid, not just the volume. If a person drinks a large quantity of plain water—which contains no sodium—the sodium level in the lumen of the jejunum will decrease, thus fluid and electrolytes will be absorbed into the jejunum from the body in an attempt to restore the sodium level to 90mmol/litre. In an intact gastrointestinal system, this does not pose a problem, since the sodium will be absorbed back into the body further down the gastrointestinal tract. However, for a person with an ileostomy, this does become a problem. As there is a shorter length of bowel through which reabsorption can occur, the resulting stoma output will be watery and high in sodium, leaving the person dehydrated.

Dehydration

Many people—both with and without an ileostomy—are chronically dehydrated every day (Ng et al, 2013). Although not severe, this mild level of dehydration is enough to cause symptoms such as headaches and tiredness (see Table 1). These are often attributed to other health conditions, but they are very frequently the result of dehydration.

A survey of GPs in the UK found that they believe dehydration to be the primary cause of at least 10% of cases of tiredness and fatigue in their patients (Natural Hydration Council, 2016). Most people simply do not drink enough for good health, but may not become aware of this until they become dehydrated.

Monitoring hydration status

The best indicator of a person's hydration status is the colour of their urine (*Figure 1*). Light, straw-coloured urine indicates sufficient fluid intake, and therefore hydration; that is, drinking enough. If the urine is darker in colour, the person is likely to be dehydrated, and more fluid needs to be consumed.

While very pale coloured urine is acceptable, if the urine becomes completely clear, too much fluid may have been consumed, which is likely to result in electrolytes being flushed out of the body. If this happens, a condition known as hyponatraemia can result, which poses a potential risk for someone with an ileostomy who consumes high volumes of plain water.

How the body loses fluid

During a typical day, the average person loses approximately 2500ml fluid through sweat, urine, breath and faeces (Jéquier and Constant, 2010). Air conditioning, warm temperatures, humid weather and central heating contribute to an increase in fluid loss. In addition to this, average ileostomy fluid losses are approximately 600–800ml per day (Black, 2000).

Physical activity further increases this fluid loss, and during strenuous physical activity it is possible to sweat a further 500–2000ml per hour, adding to fluid loss and dehydration (Casa et al, 2005). Patients should be advised that any kind of physical activity—which includes regular household routines and hobbies, such as gardening, housework, DIY and walking—can increase sweat loss, not just more traditional sports or formal exercise.

Preventing dehydration

It is important not to wait until dehydration occurs. If the ileostomy output increases, the weather gets hot or activity is increased, drinking an electrolyte solution can help the person to stay one step ahead of dehydration and remain healthy and well hydrated.

Image courtesy of ConvaTec

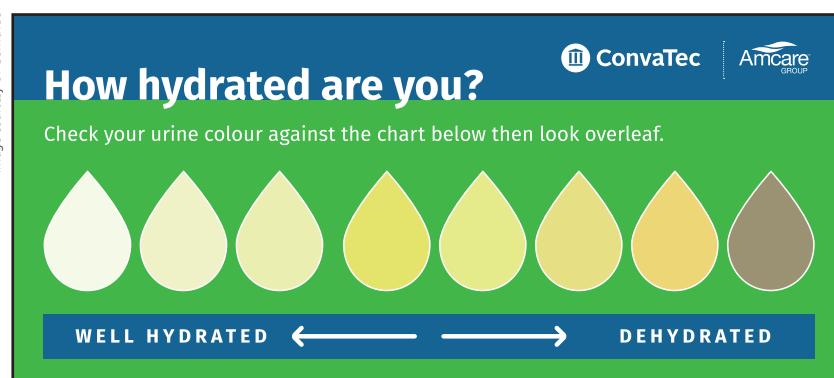


Figure 1. Urine colour chart

Many people with an ileostomy state that drinks such as strong coffee, alcohol, fizzy drinks, sugary drinks, strong fruit juice and caffeinated energy drinks can stimulate the intestine, increase stoma output and potentially make dehydration worse. Coconut water has become popular in recent years, but it is important to note that, although a very pleasant natural drink, it is high in potassium and actually very low in sodium.

Research has found milk (of any kind) to be an excellent hydrator (Watson et al, 2008), containing the right balance of electrolytes. It is easily absorbed by the body, and studies have shown it to be more effective than water in rehydration after exercise. The author has been informed by a number of people with an ileostomy that they find milk, or a chocolate milkshake, to be ideal after exercise or physical activity.

Hydration for physical activity and sport

During intense physical activity or sport, it is possible to sweat up 2 litres per hour (Casa et al, 2005). On top of the stoma losses (approximately 600–800 ml), this can create a real problem for someone with an ileostomy, and a person can become dehydrated very quickly and easily. More sodium is also lost in sweat, so this also needs to be replaced.

Being optimally hydrated is vital for people who want to participate in physical activity or sporting activities. They should aim to be well hydrated before they start any physical activity, and then they should also drink during and afterwards to rehydrate. Drinks should be chosen carefully, and an electrolyte solution or hydration sports drink should be included. Regular use of Dioralyte on a day-to-day basis may help a person to stay one step ahead, and it can be helpful with the rehydration process after exercise.

During exercise, it is important to find a drink that can be enjoyed and which does not increase ileostomy output. Advice should be given to experiment with different options to find out what works best for each individual. The concept of osmolarity is even more important during exercise, so a sports drink that has high levels of sodium and potassium and less than 4g of glucose (sugar) per 100ml should be selected. Plain water is not a good choice during exercise for people with an ileostomy.

The author suggests that physically active people with an ileostomy should aim to drink

around 300–600ml of fluid per hour during exercise, but more or less may be required, depending on personal needs. Ideally, this should not be plain water; and more suitable drinks are discussed below, including sports drinks containing high levels of sodium and potassium. Hydration backpacks are a great choice for runners, cyclists or those out hiking or walking. This enables a person to drink on the move and encourages them to drink more.

How much should someone drink?

Unfortunately, there is no simple answer to how much fluid someone with an ileostomy should drink. Each person is different, so it is important for individuals to take the time to develop their own hydration strategy to match their specific needs. Hydration is dynamic; the amount and type of fluid required will be determined by many different factors, including the activity undertaken, the weather, the environment and the ileostomy output, as well as the person's diet and stress level.

The present author often advises patients to learn to listen to their body and know how it reacts in different situations. Guidelines recommend around 6–8 glasses of fluid (1.5–2 litres) per day (European Food Safety Authority, 2010), but some people will need much more than that, especially more physically active and sporty people.

Instead of aiming for a set volume of fluid intake, it is advisable for anyone with an ileostomy to monitor their hydration status and urine colour, and then drink to meet their own needs. Ng et al (2013) identified that the majority of people, not only those with an ileostomy, are in need of an increased fluid intake and should drink more on a day-to-day basis.

What should a person drink?

Any drink—tea, coffee, milk, squash, juice, cordial, soda, as well as water—counts towards daily fluid intake (Casa et al, 2005). It is important to advise people with an ileostomy to choose a wide variety of drinks every day, as this will encourage them to drink more and balance their hydration levels. A person is more likely to drink more often if they choose drinks they enjoy. This information relates to non-alcoholic drinks, and, while it is acceptable to consume in moderation, alcohol does have a dehydrating effect on the body.

When someone has an ileostomy, it is essential to refrain from drinking excessive amounts of plain water. As discussed previously, this can flush the electrolytes from the body and increase stoma output, worsening dehydration. It is clinically appropriate to drink some water, but it is very important to drink a wide range of fluids, including squash, juice and electrolyte drinks. Electrolytes—sodium, potassium and magnesium—are essential minerals and salts vital for bodily functions. Electrolytes lost through sweat and stoma output need to be replaced.

For fluid to be absorbed effectively by the body, it is beneficial for the drink to contain a small amount of glucose, since the presence of glucose within the bowel enhances sodium absorption (Manas et al, 2003). This is an extremely important point for someone with an ileostomy to understand. Many people will drink water, as it is popularly considered to be healthy, when, in fact, it could be contributing to low electrolyte levels and dehydration. Instead, advice should be given to choose a drink that contains small amounts of glucose and sodium for optimum absorption, which patients can be advised to check for on a drink's label, as well as by tasting for the sweetness of the drink.

The osmolality of a drink is also very important. Osmolality, sometimes referred to as concentration, is the balance between water and sodium. The body's normal (isotonic) osmolality is 290 mmol/litre. From a rehydration perspective, the lower the osmolality of a drink, the faster the body is able to absorb water. Some drinks are better than others in this regard, as a drink with a lower osmolality means that the body will absorb more of the fluid and become better hydrated (Goodall, 2014). *Table 2* compares the osmolality and electrolyte content of popular drinks with World Health Organization (WHO) guidelines.

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Sports drinks

Traditional sugary isotonic sports drinks are designed to replace glucose and salts in athletes, and they are often recommended by stoma care nurses to people with an ileostomy after surgery. However, they have a very high osmolality, and they are therefore not easily absorbed by the body.

Likewise, these sports drinks—the type available from supermarkets and vending machines—typically have a low sodium content and contain an excessive amount of glucose, which can make them an unhealthy choice. In addition, such high glucose levels can increase stoma output further,

Table 2. World Health Organization (WHO) guidelines for oral rehydration solutions (ORS) compared with the contents of commonly recommended drinks

	Osmolarity (osm/litre)	Energy (kcal/litre)	Carbohydrate (mmol/litre)	Sodium (mmol/litre)	Potassium (mmol/litre)	Magnesium (mmol/litre)
WHO ORS guidelines	200–310	50–130	5–17	28–45	7.4–12.4	Optional
SOS Rehydrate	230	40	6	29	9.7	4
Skratch Labs	280	180	22	13	1	1.25
Lucozade Sport	350–360	280	32	11	0	0
Coconut water	280	180	22	6.5	24	0

Source: World Health Organization (2006)

Table 3. Impact of adding flavouring to an oral rehydration solution

	Without flavouring	With flavouring	Result
Mean sodium	162+44 mmol/litre	33+14 mmol/litre	Decrease
Mean glucose	105+27 mmol/litre	93+59 mmol/litre	Increase
Mean osmolality	413+109 mmol/litre	229+113 mmol/litre	Increase

Note: Table shows the variation in sodium, glucose and osmolality in an oral rehydration solution made by a variety of people on a ward, as well as the impact of adding flavouring to that solution
Source: Culkin (2012)

increasing the risk of dehydration. High-sugar sports drinks are unhealthy, liable to cause weight gain and not easily absorbed by the body.

Some newer sports 'hydration' drinks, however, are lower in glucose and have a lower osmolality, meaning they are better absorbed by the body. All sports drinks are not the same, so it is advisable to look for—and recommend—a drink that has less than 4g of carbohydrate (including glucose) in 100ml of drink, as it will provide a better solution for optimal absorption. Therefore, drinks such as SOS Rehydrate (SOS Hydration, 2015) and Skratch Labs Daily Electrolyte Mix (Skratch Labs, 2016) may be more suitable, as these can be used on a daily basis, as well as during physical activity. There are many commercial products on the market, so it is important to read the labels carefully.

Oral hydration solutions

World Health Organization (WHO)-approved oral rehydration solutions (ORS), such as Dioralyte, are designed specifically to be absorbed well, by having an optimal balance of sodium, potassium and a small amount of glucose (WHO, 2006). Drinks like this should not be viewed as a last resort; they can be used as part of a daily hydration management strategy. The author has found that a regular intake of 200–400ml of Dioralyte every day is helpful for an active person with an ileostomy to stay well hydrated, and this intake can be increased slightly for intensive physical activity.

In the author's experience, it is frequently recommended, by medical teams, stoma nurses and dieticians, for anyone with an ileostomy at risk of dehydration due to high output to drink St Mark's solution or the Oxford Solution and aim for a sodium content of 90 mmol/litre.

Culkin (2012) suggests that compliance can be poor, due to the unpalatable taste of the ORS, and it is usual to allow patients to add a small

amount of flavouring to the solution. However, research has indicated that this reduces the sodium content, thereby rendering the solution no longer suitable (Williams et al, 2003). Culkin (2012) investigated the composition and effect of adding flavouring to an ORS made up on a ward over a 5-day period (Table 3). The study found that the unflavoured ORS had a large variability in sodium content (mean 162+44 mmol/litre), glucose content (mean 105+27 mmol/litre) and osmolality (mean 413+109 mmol/litre), and that the addition of the flavourings decreased the sodium content (mean 33+14 mmol/litre) and increased the glucose content (mean 93+59 mmol/litre) and the osmolality (mean 229+113 mmol/litre). It is worth noting that there is considerable room for human variability or error in the making of a solution, and the solutions people are likely to drink in practice will vary compared with those made meticulously when manufactured.

Summary

Good hydration advice is important for all people, especially those with an ileostomy and those who also engage in physical activity and sport. However, there are no set guidelines to enable nurses to recommend a specific fluid intake, as different people will have different needs, and their own hydration status will be dynamic and change from day to day.

Due to the alteration of absorption ability and increased fluid losses caused by the shortening of the bowel, a person with an ileostomy can be expected to be at greater risk of dehydration. However, this is not a forgone conclusion, and it is possible to manage hydration status quite effectively with the right choice of fluid intake and conscious hydration habits.

Patients should be encouraged to become more aware of their hydration status, monitor their urine colour and be aware of their own individual requirements. Furthermore, patients should receive education about avoiding drinking too much plain water or too many sugary sports

me+

Further advice and information regarding healthy hydration for those with an ileostomy is available from ConvaTec's me+ programme www.convatec.co.uk/meplus

drinks. Depending on their needs, patients should be advised to select electrolyte fluids close to the WHO recommendations for ORS, as well as a wide range of other fluids that meet their own personal requirements and tastes. **GN**

Declaration of interest Caroline Rudoni is an employee of Amcare Group and Sarah Russell is an employee of ConvaTec

Black P (2000) *Holistic Stoma Care*. Bailliere Tindall, London

Burch J (2006) Nutrition and the ostomate: input, output and absorption. *Br J Community Nurs* **11**(8): 349–51. doi:10.12968/bjcn.2006.11.8.21669

Burch J (2008) *Stoma Care*. John Wiley & Sons Ltd, West Sussex

Casa DJ, Clarkson PM, Roberts WO (2005) *American College of Sports Medicine Roundtable on Hydration and Physical Activity: Consensus Statements*. <http://tinyurl.com/pgf4t2b> (accessed 1 September 2016)

Culkin A (2012) Variability in the content of oral rehydration solution used in intestinal failure may render it ineffective. *Gut* **61**: A84. doi:10.1136/gutjnl-2012-302514b.27

European Food Safety Authority (EFSA) (2010) Scientific opinion on dietary reference values for water. *EFSA Journal* **8**(3): 1459. doi:10.2903/j.efsa.2010.1459

Goodall RM (2014) *Oral Rehydration Therapy: How it Works*. <http://rehydrate.org/ors/ort-how-it-works.htm> (accessed 1 September 2016)

Jéquier E, Constant F (2010) Water as an essential nutrient: the physiological basis of hydration. *Eur J Clin Nutr* **64**(2): 115–23. doi:10.1038/ejcn.2009.111

Manas M, de Vitoria EM, Gil A et al (2003) The gastrointestinal tract. In: Gibney MJ, Macdonald IA, Roche HM (eds). *Nutrition and Metabolism*. Blackwell, Oxford

Medlin S (2012) Nutritional and fluid requirements: high-output stomas. *Br J Nurs* **21**(6): S22–5. doi:10.12968/bjon.2012.21.sup6.S22

Natural Hydration Council (2016) *Hydration Facts*. www.naturalhydrationcouncil.org.uk (accessed 1 September 2016)

Ng DH, Pither CA, Wootton SA, Stroud MA (2013) The 'not so short-bowel syndrome': potential health problems in patients with an ileostomy. *Colorectal Dis* **15**(9): 1154–61. doi:10.1111/codi.12252

Sica J, Burch J (2007) Management of intestinal failure and high-output stomas. *Br J Nurs* **16**(13): 772–7. doi:10.12968/bjon.2007.16.13.24242

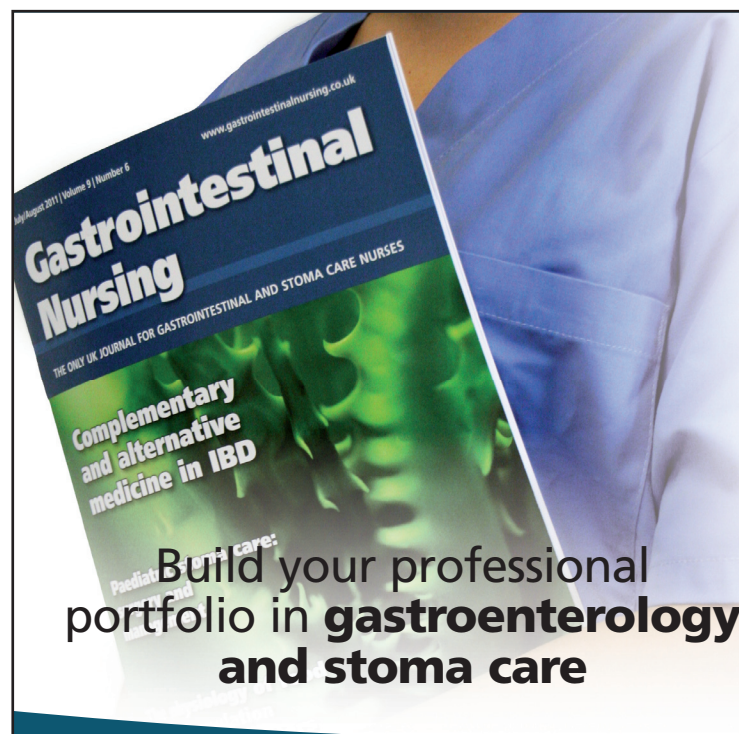
Skratch Labs (2016) *Products*. <https://www.skratchlabs.com/collections/products> (accessed 1 September 2016)

SOS Hydration (2015) *Sports Hydration*. <http://sosrehydrate.com> (accessed 1 September 2016)

Watson P, Love TD, Maughan RJ, Shirreffs SM (2008) A comparison of the effects of milk and a carbohydrate-electrolyte drink on the restoration of fluid balance and exercise capacity in a hot, humid environment. *Eur J Appl Physiol* **104**(4): 633–42. doi:10.1007/s00421-008-0809-4

Williams J, Dart J, Van Heel D, Travis SPL (2003) Effect of flavouring on isotonic solutions for short bowel syndrome. *Gut* **52**(Suppl 1): A10

World Health Organization (WHO) (2006) *Oral Rehydration Salts: Production of the New ORS*. <http://tinyurl.com/hwdqxlu> (accessed 1 September 2016)



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