

Dietary Advice for Stone Formers

Patient Information – Urology Service

Fluid intake

How much should I drink?

Drinking enough fluid is the most important aspect of preventing stone formation and will reduce your risk of stone formation by almost one third (30-40%). Not drinking enough fluid causes your urine to become concentrated and make stones more likely to form.

Aim to drink two to three litres of fluid each day and to keep your intake distributed evenly through the day.

As a rough guide, you should try to keep your urine colourless throughout the day. This equates to a urine output of at least two litres per day. In patients with cystine stones however, an output of 3.5 litres per day is required.

What should I drink?

The fluid should be in the form of water, squash, diluted apple juice, mineral water with a low concentration of minerals, or herb or fruit tea.

Caffeinated tea and coffee can be consumed in moderation but are not as suitable as the above options. Cola drinks, energy drinks, lemonades and soft drinks containing sugar, as well as alcoholic beverages, are not suitable.

In addition, it may be helpful to try and drink one or two glasses of water before going to bed and on rising in the morning. This ensures that you are well hydrated throughout the day and night.

Replace lost fluid

Make sure that you keep well hydrated. If you exercise a lot, work in a hot or air-conditioned environment, take lots of long flights, or generally sweat a lot, you must ensure that you compensate by drinking more fluids.

Other tips to help you increase your fluid intake

- Drink a large glass of water at specific times each day (e.g. when you get up, when you arrive at work, after using the toilet etc).
- Keep a bottle or jug of water at your side all day. You can flavour the water with squash (e.g. lemon and barley).
- Drinking through a straw may help you drink more.
- Add slices of lemon, lime or orange to cool water, to give it a pleasant flavour and help to alkalise your urine.
- Eat more fruit and vegetables because they contain a lot of water.
- Include moist/liquid foods in your diet (e.g. Soup, smoothies, stews).

Diet

Diet also contributes to your risk of stone formation. For your general health and for your risk of kidney stone formation, you should have a well-balanced diet and avoid an excessive number of calories.

This means that your diet should include fresh fruits, salads and vegetables, low fat dairy produce, and whole grain products such as bread or cereals. A high fibre diet is also important, although wheat bran should be avoided due to its high content of oxalate. Finally, a diet low in salt is important.

Do I need to lose weight?

It is something to consider as weight loss for those who are carrying extra weight has the added benefit of reducing your risk of Type 2 Diabetes, high blood pressure and raised cholesterol.

Obesity is a significant risk factor for stones. Your body mass index (BMI) is calculated by the following formula:

$$\text{BMI} = \text{weight (kilograms)} / \text{height (metres)}^2$$

E.g. an 80kg man who is 1.8 metres tall has a BMI of 24.7

If your BMI is over 30, you have about two times the risk of stone formation compared to those with a BMI less than 25. In general, those who are overweight tend to have acidic urine that can increase the risk of most types of stone.

Can I eat meat and protein?

A high intake of animal protein appears to increase the risk of stone formation. The intake of protein should be restricted to approximately 100g per day. Avoid large portions of red meat particularly. Reducing your protein intake also increases the amount of citrate you excrete in your urine; citrate is a known inhibitor of stone formation. You should not consume high protein drinks or supplements. Suitable protein serving sizes include:

- 50-75g red meat, fish or chicken, no more than one serve per day
- Two eggs
- 50g of cheese
- 120g yoghurt (one small pot)
- 230mL of milk.

Ideally no more than four of the above servings per day in total.

Does calcium restriction help?

Kidney stones usually contain calcium, and traditionally it was thought that it was beneficial to restrict calcium from your diet. However, a big study from Harvard University, USA, demonstrated that it is actually better to have a moderate or even slightly higher calcium intake.

The reason for this is that calcium binds oxalate in the gut and prevents it being absorbed. If oxalate is absorbed, it results in a high urine concentration that promotes stone formation. As a result, calcium restriction can actually be harmful and increase the risk of stone formation.

A daily intake of up to 1000mg per day is recommended for calcium stone formers. It might be important to reduce the calcium in your diet however, if you have excessive calcium in the urine.

Calcium is found in daily products such as milk, yoghurt, cream and cheese. A normal, varied diet will give the average person about 500mg of calcium before adding in any dairy products.

Milk and yoghurt contain about 120mg per 100g, soft cheese about 400mg per 100g, and hard cheeses up to 1000mg per 100g.

Should I avoid oxalate containing foods?

You should **try to avoid** oxalate-rich foods to reduce the amount of oxalate in your urine.

The following foods are high in oxalate:

- Rhubarb
- Celery
- Spinach
- Beetroot
- Strawberries
- Nuts (including peanut butter)
- Sesame seeds
- Tea and coffee (more than 2-3 cups/day)
- Chocolate, cocoa and carob

It is not necessary to exclude oxalate-rich foods completely; simply eat them in small amounts.

Should I restrict the amount of salt I take?

Yes. A high salt intake can contribute to calcium stone formation as well as reducing citrate levels (citrate is a stone preventing agent). Do not add salt to your food at the table, but use pepper, herbs, spices or vinegar as alternative flavourings. You can however add a small amount of salt during cooking.

You should aim to keep your salt intake to 2,300-3,000mg per day. Bear in mind that one teaspoon of salt contains approximately 2,500mg. Try to eat low salt foods - foods that contain less than 0.4g (40mg) of sodium per serving are low salt choices. Avoid high-salt, tinned, packed and processed foods (e.g. soups, salted chips or nuts, tinned meats, meat paste, smoked fish and fish paste).

Should I increase the fibre intake in my diet?

High fibre plant-based foods contain a compound called phytate which is thought to be beneficial in preventing calcium-based stone formation. The normal recommendation for fibre intake per day is 12-24g in an adult. Fibre rich foods include: wholemeal bread, porridge, baked beans, fibre cereals, dried apricots, jacket potato with the skin, and brown rice.

Are there any other tests that you can do to investigate why I form stones?

In all patients who have had a kidney stone, blood tests are done to check the kidney function and ensure that the levels of uric acid or calcium in the blood are not too high.

In high-risk stone formers, or those who have had recurrent stones, the collection of two 24-hour urine specimens for analysis is worth considering. Your urologist can tell you more about this.

Contact information

For more information about:

- Hospital and specialist services, go to www.cdhb.health.nz
- Your health and medication, go to www.healthinfo.org.nz