

Patient information

Diet and Kidney Stones

Therapies

Name:

Date:

Dietitian

What are kidney stones?

Kidney stones can develop from waste products in your urine. Large amounts of waste products in small volumes of urine can bind together to form crystals. These crystals can then bind together to create a kidney stone, these can differ in size. Tiny stones will pass from the kidney and out of the body in urine without being noticed. However, bigger stones can cause sharp, cramping pain in the lower abdomen or groin.

What causes kidney stones?

Kidney stones form when certain salts and minerals in the urine are out of balance. A family history, recurrent urinary tract infections, kidney disorders, intestinal bypass surgery, history of previous kidney stones, being overweight and hyperparathyroidism may make you more likely to develop kidney stones. A high protein, low fibre diet with inadequate fluid intake can also increase the risk of developing kidney stones

Does diet have a role in preventing and treating kidney stones?

The role of diet in kidney stones can depend on what the stones are made of. Most kidney stones are calcium based. Other types include oxalate, struvite, urate and cystine stones.

Type of stone	Dietary recommendation
Calcium oxalate	Reduce salt intake Adequate fluid intake Limit animal protein Adequate calcium intake Limit high oxalate foods Aim for a healthy weight
Calcium phosphate	Reduce salt intake Adequate fluid intake Limit animal protein Adequate calcium intake Aim for a healthy weight
Uric acid	Adequate fluid intake Limit animal protein Limit high purine foods Aim for a healthy weight
Cysteine	Reduce salt intake Adequate fluid intake Limit animal protein Aim for a healthy weight
Struvite	Adequate fluid intake

Healthy eating

Eating a healthy, balanced diet is an important part of maintaining good health.

A balanced diet should be followed, which should include less fat, sugar and salt and more fibre, fruit and vegetables.

You should aim for five portions of fruit and vegetables per day as these help make urine less acidic, which helps reduce the risk of stones developing.

A diet high in fibre can help reduce stone formation, therefore choose wholegrain varieties and eat five portions of fruit and vegetables a day.

Maintaining a healthy weight is important as obesity is a significant risk factor for stone formation. Weight loss should be gradual e.g. 1-2lbs (0.5-1kg) per week. A dietitian can advise you further on this.

Salt

Salt is made up of sodium and chloride. Sodium increases the passage of calcium through the kidney and increases the risk of stone formation. Cutting down on salt in your diet can help prevent stones forming.

Tips for reducing salt intake:

- Do not add salt (e.g. table salt, rock salt and sea salt) to your food at the table. You may use a pinch in cooking. Flavour foods with herbs, spices, garlic and lemon instead (see later section for more ideas).
- Use fewer processed/convenience foods e.g. dehydrated meals, ready meals and packet mixes.
- Limit processed and smoked meat or fish. Choose fresh / frozen or roast cuts where possible.
- Limit salty snacks such as crisps, salted nuts and salted crackers.
- Bottled sauces (e.g. soy sauce, tomato sauce, brown sauce) and high salt flavour enhancers (e.g. stock cubes, gravy granules) can be used sparingly.
- Limit foods tinned in brine (salt water). Look for foods tinned in spring water or oil instead.
- Choose fresh or frozen vegetables, or those tinned in water.
- Try not to have more than 4 oz (100 grams) of cheese per week.
- Choosing 'low salt' or 'reduced salt' foods can help. Try to look at food labels to find out which products contain less salt.

Food Labelling

Look at the Nutritional Information

Regularly checking the nutrition information on food labels can help you to choose lower salt options. Salt often appears as sodium on food labels (6g of salt is equivalent to 2.5g of sodium).

Check the label to see how much salt/sodium is in the food per 100g of product.

Nutrition		
Typical values (as consumed)	per 100g	per serving size
Energy	541kj/128kcal	2011kj/476kcal
Protein	4.9g	18.2g
Carbohydrates	20.8g	77.4g
of which sugars	1.5g	5.6g
Fat	2.8g	10.4g
of which saturates	2.3g	8.6g
Fibre	2.1g	7.8g
Sodium	0.1g	0.5g
Salt equivalent	0.3g	1.3g

Look at per 100g of product

Look at the amount of salt or sodium

Then compare it against this table which outlines what is 'a little,' 'a moderate' amount or 'a lot' of salt/sodium per 100g of product.

	Little (eat freely)	Moderate (eat occasionally)	A Lot (try to avoid)
Sodium (per 100g)	0.1	0.3	0.6
Salt (per 100g)	0.25	0.75	1.5

If the label says that the product contains a 'trace' amount of sodium or salt, it means it has minimal amounts and is therefore suitable to have.

Fluid

Increasing your fluid intake can help dilute your urine and keeps calcium, oxalate and uric acid levels down. You should aim to drink at least 2.5-3.5 litres (4-6 pints) of fluid per day.

You can tell how diluted your urine is by looking at its colour. The darker your urine is, the more concentrated it is. Aiming to produce at least 2 litres of urine per day reduces the risk of developing kidney stones.

Your urine is usually a dark yellow colour in the morning because it contains a build-up of waste products that your body has produced overnight.

	Good
	Good
	Fair
	Dehydrated
	Dehydrated
	Very dehydrated
	Severe dehydration

Tips to help you maintain your fluid intake:

- Drink a large glass of water at specific times during the day, for example when you get up in the morning, and at several intervals throughout the day.
- Keep a large bottle of water or juice (no added sugar) with you and sip from it throughout the day.
- Drink two glasses of fluid at each meal-one before and one after eating.

Tea, coffee and alcohol can be consumed in moderation but the majority of your fluid intake should be from water, juice or diet fizzy drinks.

Protein

High protein diets maybe associated with stone formation. Protein increases urinary calcium, oxalate and uric acid excretion by making urine more acidic. It is recommended that people known to be stone formers should not eat excessive amounts of animal protein, which is found in meat, fish, eggs and dairy products.

An ideal portion size of protein is:

- one chicken breast (3-4oz)
- two lamb chops (3-4oz)
- one fish fillet (3-4oz)
- two slices of roast meat (3-4oz)
- two eggs (have this no more than twice a week)
- one portion of cheese (2oz) (have this no more than twice per week)

You should have no more than two portions per day.

You may also benefit from including some vegetable sources of protein in place of meat as this can also reduce the risk of you developing stones by making the urine less acidic e.g. kidney beans, broad beans, lentils, soya beans, tofu, sesame seeds, sunflower seeds, nuts etc. (if you have oxalate based stones see section on oxalate below).

Oxalate

Reducing oxalate rich foods does not necessarily reduce formation of calcium oxalate stones. It is the amount of oxalate the body produces that is thought to be the main cause.

The oxalate content of foods varies considerably between plants from the same family, possibly due to differences in soil quality, ripeness, climate, harvest method, storage and methods used for analysis.

It is sensible to limit excessive amounts of high oxalate foods, especially if you know your kidney stones are oxalate based.

The following foods are high in oxalates and therefore should be avoided:

- Spinach
- Beetroot
- Parsley
- Swiss Chard
- Leeks
- Okra
- Celery
- Rhubarb
- Wheat germ
- Nuts especially peanuts, pecans and almonds,
- Chocolate
- Instant coffee
- Strong tea

Uric acid

If you form uric acid stones, you should try to limit the amount of purines in your diet. These are substances that are found naturally in most foods and are broken down by the body into uric acid.

The following foods are high in purines and should be taken in moderation or avoided:

Fish sources	Meat sources	Other sources
Anchovies Crab Shrimps Fish roe Mackerel Sardines Herring Whitebait Eel Mussels Scallops	Liver Heart Kidney Sweetbreads Meat extract (e.g. Oxo, Bovril) Goose	Yeast extract (e.g. marmite) Asparagus Cauliflower Mushrooms Beans, peas, lentils Spinach Quorn Beer

Uric acid formation is also higher in overweight individuals, so losing weight may be beneficial. Gradual weight loss (e.g. 1-2 lbs/0.5-1kg per week) can be of benefit, and will reduce stress on your joints. However, fasting or strict dieting may cause an increased rate of cell breakdown, which can cause urate levels to rise. A dietitian can advise you further on this.

Calcium

Although most stones contain calcium, the calcium from food does not cause stone formation. Eating less calcium can lead to weak bones. A normal calcium intake can help prevent stones as it binds to oxalate in the gut and prevents it being absorbed. Calcium supplements are not advised.

You should include dairy products like milk, yoghurt and cheese (within allowance) in your diet every day

Supplements and other information

Some vitamins and food/herbal supplements can increase the risk of stone formation therefore you should avoid the following:

- High dose vitamin C supplements.
- Over the counter calcium or vitamin D supplements. Your consultant or dietitian will advise you if you need these.
- Turmeric supplements.
- Cranberry tablets.

Do not take any other supplements or tablets. For further information discuss this with your doctor or pharmacist.

Summary

In summary the following dietary suggestions can help prevent recurrence of kidney stones:

- Aim to drink at least 2.5-3.5 litres (four to six pints) of fluid every day.
- Avoid excessive salt intake.
- Avoid excessive amounts of protein, especially animal protein in the diet.
- Have an adequate calcium intake.
- Limit intake of high oxalate foods if stone is oxalate based
- Limit intake of purine containing foods if stone is uric acid based.
- Maintain a healthy weight.
- Avoid vitamins and food/herbal supplements.

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Further information

Department of Dietetics

Tel: 0151 706 2120

Text phone number: 18001 0151 706 2120

Author: Renal Dietitians, Therapies Department

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