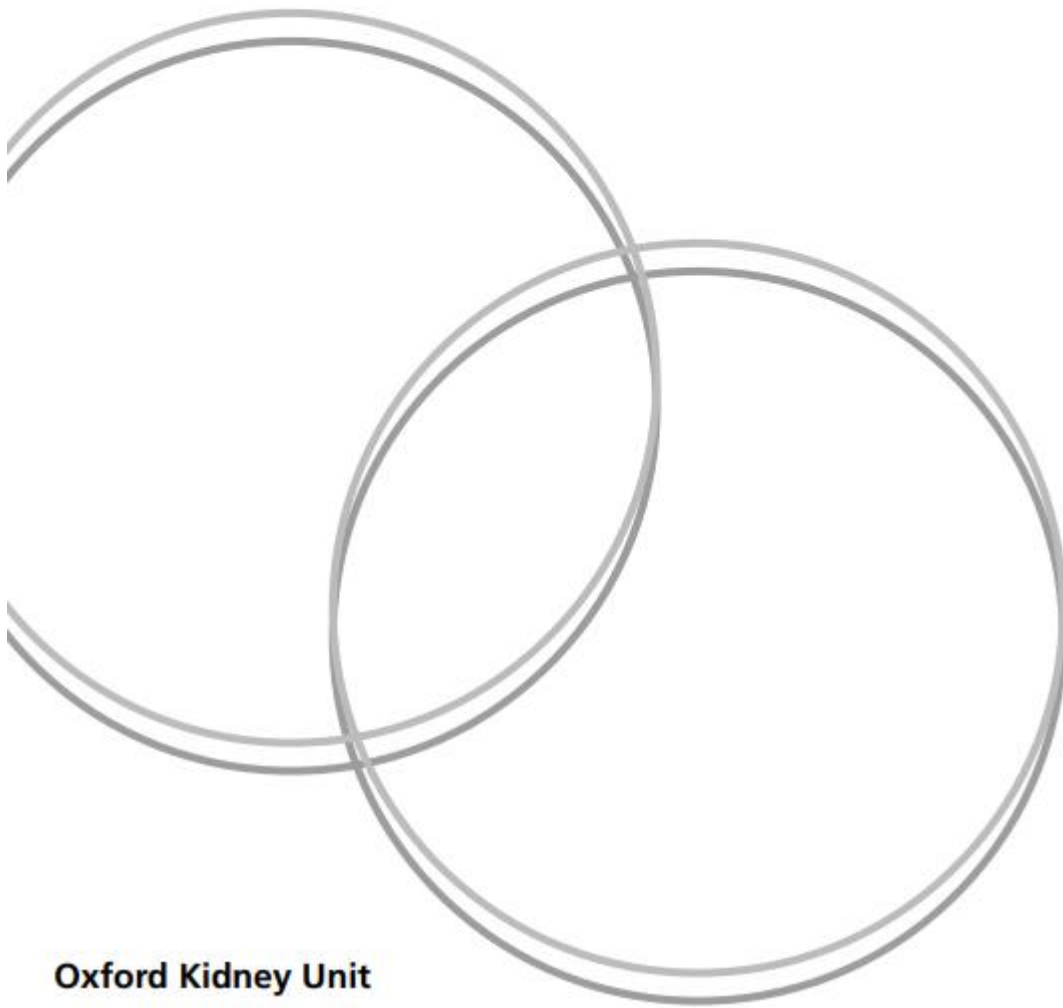




Oxford University Hospitals
NHS Foundation Trust

Dietary advice for people with Kidney Stones

**A guide to healthy eating for people
who form calcium kidney stones**



Oxford Kidney Unit

Background

This leaflet provides information on how to alter your diet to reduce your risk of kidney stones.

Kidney stones develop from tiny mineral deposits within the kidney, which then increase in size to form visible fragments. This happens when urine is very concentrated.

The majority of kidney stones are calcium-containing. These include calcium oxalate or calcium phosphate types.

You may be at higher risk of kidney stones if you have:

- A family history of kidney stones.
- Urinary tract abnormalities.
- Frequent urinary tract infections.
- Absorption problems e.g. gastric bypass, Crohn's disease, intestinal resection.
- Gout.
- Obesity, diabetes, hypertension, metabolic syndrome.

Your diet and lifestyle can reduce the growth of kidney stones.

- Reduce the acidity and change the amount of stone forming substances in your urine by changing your diet.
- Increasing your urine volume to 2-3 litres a day.
- Promoting a healthy lifestyle to address obesity, diabetes and hypertension.

Fluid

The most important thing you can do to prevent the formation of stones is to increase the amount of fluid you are having. Passing urine regularly, including through the night, helps prevent stone formation.

Aim to drink at least two and a half to three litres of water a day.

Some fluids are better to drink than others:

- Adding lemon or lime juice to water increases citrate levels in your urine. This can reduce your risk of forming oxalate stones. Add 60ml of concentrated lemon or lime juice (or the juice of three to four lemons or limes) to one litre of water.
- Avoid carbonated and sugar-sweetened drinks, such as cola, orangeade, energy drinks and sparkling water. If choosing a carbonated drink; lemonade or diet lemonade with a higher percentage of lemon juice is a better option.
- Choose no added sugar squashes or cordials.
- Always add milk to tea and coffee if you have oxalate stones to help reduce oxalate being absorbed in your gut.

Salt

A high salt diet leads to high sodium, high calcium and low citrate levels in your urine which can lead to stone formation. You should aim to reduce the amount of salt in your diet, particularly from convenience foods, which can contribute up to 75% of the salt in your diet.

There are different varieties of salt including celery salt, garlic salt, Himalayan salt, rock salt, sea salt and table salt. They all contain sodium and should not be added to food in cooking or at the table. Alternatives to salt, such as LoSalt and So-Low are not recommended as they do not allow your taste buds to adapt to a low salt diet.

Tips on how to reduce your salt intake include:

- Reduce smoked, cured or canned meats and fish, such as bacon, ham, sausages and smoked salmon. Instead choose fresh meat or fish, e.g. fresh beef, chicken, cod or salmon.
- Reduce salty snacks such as crisps, salted nuts or salted biscuits.
- Reduce tinned and packet soups, gravy granules, stock cubes and condiments. Choose lower salt varieties.
- Reduce cheese with a high salt content. Lower salt cheeses include cottage cheese, cream cheese (e.g. Philadelphia) and mozzarella.
- You can season your food using herbs, spices, chilli or curry powder, lemon juice and garlic.
- When eating out or ordering a take-away ask the chef for no salt or monosodium glutamate (MSG).
- Reduce the amount of ready-made foods you eat.

Look at food labels when making decisions on which foods to buy. Remember, food labels may show the salt content per 100g and not always the salt content of the entire portion. Choose foods with more green coding and fewer with amber coding. Avoid foods with red coding.

This is high	This is moderate	This is low
Over 1.5g per 100g or over 1.8g per portion	0.3-1.5g per 100g	Under 0.3g per 100g

For more information on salt content of foods and tips for reducing salt intake, please see our diet sheet "Reducing Salt Intake – Information for renal patients".

Healthy eating

Healthy eating and maintaining a healthy weight can help reduce kidney stones being formed. Below are some top tips for healthy eating:

- Eat a variety of different foods.
- Eat at least 5 portions of fruit and vegetables per day in a variety of colours.
- Choose low-sugar and low-fat products.
- Have less foods high in sugar and fat, such as biscuits, chocolate, cake, sweets, crisps, sugar-sweetened drinks, butter and oils and red meats.
- Eat plenty of wholegrain starchy foods rather than white refined foods, as these are high in fibre.
- Use healthy cooking methods (grilling, dry roasting or steaming)
- Follow NHS alcohol recommendations. Current advice is to limit alcohol intake to no more than 14 units spread across a week, having at least 1 to 2 alcohol free days in this period.
- Eat the right amount to be a healthy weight." A healthy weight is a body mass index (BMI) between 20-25kg/m². You can calculate your BMI by using the "BMI healthy weight calculator" on the NHS live well website. If your BMI is above 25kg/m² you may wish to consider losing weight."

If you are overweight and would like to lose weight, below are some tips:

- Don't mistake thirst for hunger – have a glass of water and wait 30 minutes before reassessing your hunger.
- Try sugar-free gum or sweets in between meals.
- Make sure meals are of a sensible size – you could try using a smaller plate.
- Try to limit snacks between meals. If you need a snack, choose lower calorie options like vegetable sticks, a piece of fruit or a handful of plain popcorn.
- Keep yourself occupied, boredom can lead you into the kitchen.
- Be as active as you can, to burn excess calories.
- For a 12-week diet and exercise plan, see the NHS website: www.nhs.uk/Livewell/weight-loss-guide/Pages/losing-weight-getting-started.aspx

Fruit and vegetables

Fruit and vegetables can help reduce stones forming, particularly if you have oxalate stones as they provide citrate which reduce the acidity of urine.

- Aim for at least five portions of fruit and vegetables per day.
- One portion = one medium-sized fruit, e.g. apple, banana; two small fruits, e.g. plum, satsumas or three tbsp of cooked vegetables.

Meat

There is some evidence to suggest that a diet high in animal protein may cause stones to form. A vegetarian diet including dairy may have a protective effect. There is no need to stop eating meat but here are some ideas to reduce the amount of animal protein you eat and plant proteins you can replace it with:

- Limit meat and fish to no more than 200g (8oz) a day. Preferably spread throughout the day.
- Beans and lentils are good sources of vegetable protein. Use to replace some or all the meat in dishes e.g. lentils or reduced-salt baked beans in shepherd's pie, beans in chilli con carne or lentils in stews and hot pots.
- Have less processed meats, such as bacon, sausages and ham.

Calcium

It is not recommended to go on a low calcium diet as this can cause more stones to form. This is because calcium binds to oxalate in the gut to reduce the amount of oxalate absorbed.

- A moderate calcium intake (700-1200mg/day) through food is recommended. You would achieve this by having three to four of the following a day:
 - 200ml of milk – if choosing a plant milk such as soya, oat, almond or rice milk have those fortified with calcium
 - 30g of cheese
 - 120g of yoghurt
 - 80g of tofu
 - 60-100g of tinned fish with edible bones, such as sardines and pilchards.
- Choose lower fat varieties.
- The use of calcium supplements is not recommended, unless prescribed by your doctor.

Oxalate

There is some uncertainty about how much oxalate the body absorbs from these foods but having an adequate calcium in your diet can help reduce absorption of oxalate from the diet. If you have been diagnosed with oxalate containing stones, you may wish to avoid the following high oxalate foods or to eat them in small amounts.

- beetroot
- black tea (always have tea with milk)
- cereals containing added wheat bran and/or nuts such as All Bran, Bran Flakes, Sultana Bran, Shredded Wheat, Weetabix, granola, muesli
- chocolate
- miso soup
- nuts (almonds are particularly high in oxalate)
- rhubarb
- Spinach.

Supplements

The best way to make sure you get enough vitamins and minerals is through a healthy, well-balanced diet.

Extra supplementation of vitamins and minerals may not be recommended. Always ask for advice from your doctor.

There is no evidence that supplementation of omega 3/DHA/EPA fish oils helps reduce the risk of kidney stone formation.

This document was created by the Renal Dietitians from the Oxford Renal Unit and has been shared with their permission.