

Dietary Recommendations

You have been given this leaflet because you have been diagnosed with urinary stones. The aim of the leaflet is to provide you with advice on how to modify your diet and fluid intake to reduce your risk of getting further stones.

Key Points

- Drink plenty of fluid: 2-3 litres per day
- Limit foods with high oxalate content
- Eat enough dietary calcium
- Avoid extra calcium supplements
- Eat a moderate amount of protein
- Avoid high salt intake
- Avoid high doses of vitamin C supplements

How much do I need to drink?

Drinking plenty of fluid is the most effective way of preventing stone formation and reduces your risk of stone formation by almost one third (30 to 40%). Not drinking enough can cause your urine to become concentrated, making stones more likely to form. Try to drink two to three litres (four to six pints) of fluid (water or squash) each day. You should aim to keep your urine colourless throughout the day. This should give you a urine output of at least two litres (four pints) per day. If you have cystine stones, you will need to drink enough to produce more than four litres of urine each day. You can drink tea, coffee & alcohol in moderation, but most of your fluid intake should be water or squash. Try to avoid sodas, sweetened iced tea and grapefruit juice. Be mindful of heavy sweating through use of saunas, hot yoga and heavy exercise which may lead to less urine production allowing stone-causing minerals to deposit in the urinary system.

Tips to help you increase your fluid intake are:

- » 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 by your side all day; you can flavour it with fruit squash;
- » Try to drink one glass of water every hour; and
- » Eat more fruit & vegetables because they contain a lot of water.

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Dietary Recommendations for Kidney Stone Formers

for patients of

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Does what I eat influence stone formation?

What you eat is not as important as how much you drink, but it does play a part in stone formation.

It is essential to have a well-balanced diet, avoiding too many calories. This should include fresh fruit, salad and vegetables, low-fat dairy produce, and whole grain products such as bread or cereals. A high fibre intake is helpful, although you should not eat **wheat bran** because of its high oxalate content.

Is calcium in my diet bad for stones?

Interestingly, reducing the amount of calcium in your diet can increase the risk of stone formation, by raising oxalate levels in your urine. A daily intake of up to 1000 mg per day is safe for calcium stone formers. Most dietary calcium is found in dairy products (milk, yoghurt, cream and cheese). A normal, varied diet will give you about 500 mg of calcium each day. The approximate calcium contents of dairy produce are:

Milk & Yoghurt	120mg per 100g
Soft Cheese	400mg per 100g
Hard Cheeses	up to 1000mg per 100g

If you have too much calcium in your urine, you may benefit from restricting your calcium intake. If consuming calcium foods, it is best to eat with oxalate-rich foods during a meal as they are more likely to bind together before entering the kidneys, making it less likely that kidney stones will form.

Does oxalate intake play a part in stone formation?

Yes. You should try to avoid oxalate-rich foods to keep the oxalate levels in your urine at a normal level. You should avoid eating rhubarb, celery, spinach, beetroot and sesame seeds, all of which have a very high oxalate content.

Black tea, chocolate, nuts (including peanut butter), cocoa and carob are all moderately high in oxalate. You should take them in moderation but you do not need to exclude them completely.

Should I restrict my salt intake?

Yes. A high salt intake can increase calcium stone formation. Do not add salt to your food at the table: use pepper, herbs, spices or vinegar as alternative flavourings. You can, however, add a small amount of salt to your food during cooking.

You should limit your intake to between 2300 and 3000 mg/day (approximately one teaspoonful of salt). Try to eat foods with a low salt content. Avoid tinned, packet or processed foods (e.g. soups, salted crisps or nuts, tinned meats, meat paste, smoked fish and fish paste), all of which have a high salt content.

Is there anything else I can do to help myself?

It is important to reduce your weight if you are overweight. Increased physical activity should be part of any weight-reducing programme. Remember to drink plenty of fluid and avoid getting dehydrated if you sweat a lot during exercise.

Are there any other tests you can do to find out why I have made stones?

Yes. All patients who have had a kidney stone should have blood tests to check their kidney function, and make sure that their uric acid and calcium levels are not raised. In high-risk stone formers (young patients and those who have had repeated stones), two 24-hour urine samples should be collected to measure the level of several chemicals in your urine. Your urologist, specialist nurse or GP can tell you more about this.

Is there anything I can do to prevent certain types of stone?

Calcium Oxalate Stones

Only 10 - 15% of oxalate in your urine comes from dietary intake. It is not, therefore, necessary to eliminate oxalate-containing foods completely from your diet. You should, however, aim for a moderate (and sensible) intake of oxalates.



Foods which are especially high in oxalates should be consumed sparingly. The following foods are known to have a high oxalate content:

- » **Tea** and **coffee** (more than two to three cups per day)
- » **Nuts** (e.g. almonds), **sesame seeds & nut products** (e.g. peanut butter)
- » **Cocoa** and **chocolate**
- » **Some fruit** (figs, tangerines, plums, berries & currants)
- » **Rhubarb**
- » **Soy products** (tofu, soy milk, soy cheese & soy ice cream)
- » **Some vegetables** (celery, spinach, leeks, okra, parsley & beetroot)

Uric Acid Stones

Try to limit your dietary intake of purines. These are naturally-occurring chemicals, found in most foods, which are broken down by the body into uric acid. The main dietary sources of purines are:

- » **Meat:** all meats, including liver, heart, kidney, sweetbreads & meat extracts (e.g. Oxo)
- » **Fish:** especially anchovies, crab, fish roe, herring, mackerel, sardines, shrimps & whitebait
- » **Others:** yeast extracts (e.g. Bovril), beer, asparagus, cauliflower, mushrooms, peas, beans & spinach.

Uric acid levels are often higher in people who are overweight, so losing weight can help you. Taking the drug allopurinol, which lowers uric acid levels in the blood, has not been shown to help in reducing the risk of uric acid stones.

Calcium Phosphate Stones

Dietary changes have little effect on the formation of calcium phosphate stones. The previous advice is valid but you should avoid taking anything to alkalise your urine.

Struvite (“Triple Phosphate”) Stones

Mostly seen in postmenopausal women and are usually due to urine infection. The bacteria involved (*Proteus* species) produce an enzyme (urease) which splits urea in your urine to form ammonia. This makes the urine highly alkaline, encouraging the formation of calcium, magnesium, ammonium (“triple”) phosphate stones. Once these stones form, they encourage further infection, resulting in a “vicious circle” of rapid stone growth. A high fluid intake, low-dose antibiotics (as necessary) and acidification of the urine are all effective, but the main aim is to get rid of all your stones, which eliminates the potential for recurrent urinary infections. Drugs (urease inhibitors) are available that block the enzyme produced by the bacteria, but they are not normally used because of the high-risk of major side-effects.

Cystine Stones (Cystinuria)

Simple, basic measures remain the most important way of preventing cystine stone formation:

- » **Increase your fluid intake** - you must drink enough fluid to produce two or three litres of urine per day; this usually means you need to get up at night to drink water
- » **Modify your diet** - reduce your intake of methionine (from which cystine is formed) by cutting your animal protein intake
- » **Alkalise your urine** - this encourages cystine to dissolve in your urine. We normally do this using potassium citrate; this tastes unpleasant, and some patients can only tolerate it by flavouring it with fruit juice
- » **Monitor your urine acidity (pH)** - using a Lit-Control® pH Meter or special pH dipsticks, to be sure that your urine stays alkaline. Your urologist or specialist nurse can advise you on this.