METROVAN UROLOGY
metrovanurology.com
#650 – 6091 Gilbert Road
Richmond, B.C. V7C 5L9
Tel: **604 273 4320** (24 hrs)
Fax: 604 273 7599

Calcium Intake and Kidney Stones

Information for Patients

Calcium is essential for living organisms to survive. In addition to its well-known function of maintaining the health of bones and teeth, it is also critical for blood clotting, nerve conduction, and muscle contractility. There is a complex interplay between calcium in the bones, blood and other tissues which is controlled by the parathyroid glands, kidneys and the gastrointestinal system.

There are several types of calcium-containing kidney stones including:

1. Calcium Oxalate
2. Calcium Phosphate
3. Mixed Calcium

Increased calcium levels in the *urine* can promote kidney stone formation. However, because of the complex way in which stones form and how calcium levels are controlled, **a *reduced* calcium diet tends to *increase* stone formation in most people** and can also have other negative effects such as exacerbating osteoporosis. Therefore, the majority of people who form stones benefit from a diet with normal calcium intake – **1000-1200 mg per day**. Conversely, increasing calcium intake above the recommended amount may increase the chances of stone formation.

Consuming oxalate and calcium containing foods at the same time limits oxalate absorption because the calcium-oxalate complex becomes non-absorbable in the gut. One other important way to reduce excess urinary calcium bears mentioning. Excess salt (NaCl) is removed through the kidneys. This process draws calcium into the urine. Reducing your salt intake will reduce urinary calcium and decrease stone formation.

There are exceptions to these guidelines and your urologist will let you know if they apply to you.

Oxalate and Kidney Stones

Oxalate is a chemical which is naturally found in the body. The liver is the major source of urinary oxalate excretion but dietary intake of oxalate can also be a significant contributor. Oxalate is found in many plant foods but is not found in animal foods. Oxalate binds to calcium to form calcium oxalate (CaOx) stones which are the most common type of kidney stone. In fact, high urinary levels of oxalate are thought to be a more important factor in stone formation than urinary calcium levels.

Consuming oxalate and calcium containing foods at the same time limits oxalate absorption because the calcium-oxalate complex becomes non-absorbable in the gut. This is why consuming normal amounts of calcium during meals may prevent CaOx stones. The critical factor in dietary oxalate is *bioavailability*. The high oxalate found in many foods is not present in a form which is readily absorbable. There are differences in how well people absorb oxalate – some people are ‘super

#650 – 6091 Gilbert Road
Richmond, B.C. V7C 5L9
Tel: **604 273 4320** (24 hrs)
Fax: 604 273 7599

Information for Patients

absorbers' and can absorb 50% more oxalate than regular people.

In general, the disadvantages of oxalate in beverages is outweighed by the extra water you intake when drinking them. Your goal should be to reduce your oxalate intake. This does not mean you can never enjoy chocolate or nuts again, simply that you exercise restraint and moderation. A quick internet search will quickly reveal that many foods contain oxalate. Avoiding those with the highest concentration, however, should keep your daily oxalate intake to less than 50 mg per day.

General Advice for Preventing Stones*

1. **Aim for a urinary volume of 2-3 L/day**. This amounts to about 8-10 glasses. Increase fluid intake in hot/humid weather or with major physical activity.
2. **Limit animal protein to < 200 g/day (4-6 ounces)**.
3. **Limit salt/sodium to < 6 g/day**. Limit table salt, soy sauce, pickled vegetables. Processed and canned food as well as food in restaurants are often high in salt.
4. **Increase your intake of citrate** (esp. lemon and lime juices). Adding lemon juice to your drinking water is a quick way to increase citrate intake.
5. **Do NOT reduce your dairy/calcium intake** – aim for 1200 mg per day

* This advice is applicable to any type of stone composition

Approximate Amount of Calcium of Per Serving
Aim for about 1000 mg per day

Food	Serving	mg Ca
Antacids	1 tablet	200-600
Bread, oat bran	1 slice	23
Brocolli, cooked	½ cup	30
Canned salmon with bones	1/3 can	170
Cottage cheese	125 ml	70
Hard cheese	30 g	400
Lentils & beans	¾ cup	25-50
Milk	250 cc	300
Orange	1	60
Orange juice, from concentrate	250 ml	20
Orange juice, calcium fortified	250 ml	300
Yogurt	¾ cup	300

Limit the Foods Highest in Oxalate

Spinach (raw)
Rhubarb
Star fruit
Beet roots or leaves
Tea (black)
Tree nuts: almonds, cashews, hazelnuts, walnuts, pecans, pistachios
Chocolate (esp. dark)
Wheat bran
Legumes: beans, peanuts, soybeans, tofu, textured vegetable protein, meat substitutes, links and patties

Sources: Borghi et al. Dietary therapy in idiopathic nephrolithiasis. Nutrition Reviews 2006; Massey. Food Oxalate: factors affecting measurement, biological variation and bioavialability J Am Diet Assoc 2007