

# Calcium Oxalate Stone Prevention

How can you prevent calcium oxalate stone formation?

**Calcium restriction** – this was once the advice given to stone formers, and you may hear this even today. This is no longer recommended because; 1) Cutting down on calcium increases the risk of stone formation. Most calcium in the diet remains in the gut where it binds to oxalate from food and the liver. The bound oxalate cannot be absorbed and is excreted in the feces. This means it never enters the bloodstream or the kidneys and never causes stones. 2) Calcium is an essential nutrient. A low calcium diet can lead to osteoporosis, a crippling bone disease seen in many elderly men and women.

**Oxalate restriction** – Oxalate is common in foods, and it is not difficult to consume a large amount of oxalate within an otherwise healthy diet. This can increase the risk of developing stones. (See the back of the page for a list of high oxalate foods).

**Sodium restriction** – a high sodium (salt) diet is one of the strongest contributors to stone disease in western society. Sodium exchanges for calcium in the kidney. A diet high in salt puts more calcium into the urine. The obvious way to reduce salt intake is not to add it to your cooking and remove the salt shaker from the table. Restriction of salty foods like preprocessed or “take-away” foods is also very helpful.

**Protein restriction** – the western diet is high in protein. This creates a large amount of acid in the body which the kidneys must excrete. Long term, this results in extra calcium in the urine and the depletion of bone calcium, which causes osteoporosis. Food high in protein includes all meats, nuts, soy and dairy products.

**Fluids** – there is no doubt that water intake is important to stone formers. Stones can develop within a few minutes in the laboratory if the components are found in a high enough concentration. In the body, stones may progressively grow during favorable times i.e. after a high oxalate/protein load on a hot day. It is advisable to consume at least eight (8 ounce) glasses of water per day on normal conditions and more in the summer days. Lemonade is a good substitute if water is undesirable. Lemonade contains an ingredient called citrate which is a complexor of calcium. That means it can bind calcium in the urine to make it more soluble. Low citrate is a common finding in recurrent stone formers.

**Excess Vitamin C** can contribute to stones. Vitamin C is broken down in the liver into the oxalate. Most vitamin C is in the form of sodium ascorbate, a high dose of salt also.

**So, what are the sensible things I can do?**

1. Drink more fluids
2. Limit salt intake
3. Limit oxalates
4. Reduce protein intake
5. Eat more citrus fruits
6. Keep eating calcium (the recommended daily allowance for post menopausal women is 1200 mg/day)

# Low-Oxalate Diet

What you should do. Do not eat the foods on the high-oxalate food list. You may eat foods on the moderate-oxalate list 3-5 times each week and foods on the low oxalate list as often as you like. If you awaken during the night, drink another cup of water. If you are a coffee drinker, drink only one cup a day, and limit your cola drinks to 1 can a day. Please keep in mind that you still have to eat.

## High-Oxalate Foods

### **Beverages:**

Chocolate milk  
Chocolate drink mixes  
Hot cocoa  
Tea

### **Fruits:**

Berries of all kinds  
Currants  
Fruit cocktail  
Lemon, lime, orange peel  
Marmalade  
Purple grapes  
Rhubarb  
Tangerine  
Juices from these fruits

### **Vegetables:**

Beans: green, wax, dried  
Beets and beet greens  
Celer  
Cucumbers  
Eggplant  
Green peppers  
Greens of all kind  
Okra  
Parsley  
Rutabagas  
Spinach  
Squash  
Tomato Soup  
Vegetable Soup

### **Starches:**

Fruitcake  
Grits  
Soybean products  
Sweet potatoes  
Wheat germ and bran

### **Meats:**

Baked beans in tomato sauce  
Peanut butter  
Tofu

### **Fats and Oils:**

Nuts (of all kinds)  
Sesame seeds

### **Other:**

Chocolate  
Cocoa  
Beer

## Moderate-Oxalate Foods

### **Fruits:**

Apricots  
Cherries  
Cranberry juice  
Grape juice  
Orange: fruit or juice  
Peaches  
Pears  
Pineapple  
Prunes  
Purple plums  
Jelly or Jam with these fruits

### **Vegetables:**

Asparagus  
Broccoli  
Brussels sprouts  
Carrots  
Corn  
Green peas, canned  
Lettuce  
Lima beans  
Tomato  
Turnips

### **Meats:**

Sardines

### **Starches:**

Cornbread  
Sponge Cake  
Spaghetti or tomato sauce

## Low-Oxalate Foods

### **Beverages:**

Buttermilk  
Lemonade  
Milk

### **Fruits:**

All those not listed

### **Vegetables:**

Avocado  
Cabbage  
Cauliflower  
Mushrooms  
Onions  
Peas (fresh or frozen)  
Potatoes  
Radishes

### **Meat:**

Beef, lamb, or pork  
Cheese  
Eggs  
Fish and shellfish  
Poultry

### **Starches:**

Bread made without bran, wheat germ,  
or whole grains  
Cereals  
Macaroni  
Noodles  
Rice  
Spaghetti (plain)

### **Fats and Oils:**

Bacon  
Butter  
Margarine  
Mayonnaise  
Salad dressings  
Vegetable oils

### **Other:**

Coconut  
Lemon or lime juice  
Sugar

### Low Oxalate Diet (cont.)

Your doctor has prescribed a Low Oxalate Diet. It is meant to provide less than 50 mg of oxalate per day. Oxalate is formed breakdown of some types of foods, mostly from plant sources. To reduce calcium oxalate stones from being formed, a diet adequate in calcium as well as an oxalate restriction is advised. When enough calcium from the diet is available, it binds with oxalate to make it less available for absorption. A rise of oxalate in the urine from increased absorption may promote the formation of stones.

FOOD GROUPS	LOW OR NO OXALATE (Less than 2 mg/serving)	MODERATE OXALATE (2-10 mg/serving)	HIGH OXALATE (Greater than 10 mg/serving)
Vegetables (1/2 cup cooked, 1 cup raw)	Avocado Brussels sprouts Cauliflower Cabbage Mushrooms Onions Peas, green (fresh or frozen) Potatoes, white Radishes	Asparagus Broccoli Carrots Corn: sweet white or yellow Green peas, canned Lettuce Lima beans Parsnips Tomato, 1 small or 4 oz juice Turnips	Beans: green, wax, dried Kale Leeks Beets: root, greens Mustard greens Okra Pokeweed Parsley Celery Peppers Chives Potatoes, sweet Cucumbers Rutabagas Dandelion greens Spinach Summer squash Eggplant Watercress Escarole
Fruit/Juices (1/2 cup canned or juice, 1 medium fruit)	Apple & apple juice Avocado Banana Cherries, bing Grapefruit, fruit & juice Grapes, green Mangoes Melons: cantaloupe, casaba, honeydew, watermelon Nectarines Pineapple juice Plums, green or yellow	Apricots Black currants Cherries, red sour Cranberry juice Grape juice Orange, fruit and juice Peaches Pears Pineapple Plums, purple Prunes	Berries (blueberries, dew berries, blackberries, raspberries, strawberries) Currants, red Fruit cocktail Grapes, purple Lemon peel Lime peel Orange peel Rhubarb Tangerine Juices made from above fruits
Bread/Starches (1/2 cup unless otherwise indicated)	Bread (1 slice) Breakfast cereals Macaroni Noodles Rice	Cornbread (2" square) Sponge cake (1" slice) Spaghetti, canned in tomato sauce (1/2 cup)	Amaranth (1/2 cup) Fruit Cake (1/8 cake) Grits, white corn Soybean crackers Wheat germ and bran (1 cup)
Fats/Oils	Bacon (2 slices) Mayonnaise 1 tbs Salad dressing 1 tbs Vegetable oils 1 tbs Butter, margarine 1 tbs		Nuts: peanuts, almonds, pecans, cashews, walnuts (1/3 cup) Nut butters (6 Tbsp.) Sesame seeds (1 cup)
Miscellaneous	Coconut Jelly or preserves (made with allowed fruits) Soups (with allowed ingredients) Sugar	Chicken noodle soup, dehydrated	Carob (3/4 cup) Coconut, cocoa (3-4 oz) Vegetable soup (1/2 cup) Tomato soup (1/2 cup) Marmalade (5 Tbsp.)
Beverages	Beer, bottled light Carbonated cola (limit 12 oz/day) Distilled alcohol (1 oz) Lemonade or limeade (without added vitamin C) Milk (whole, low fat, or skim) Buttermilk Wine: red, rose', white (3-4 oz) Yogurt (with allowed milk)	Coffee (limit to 8 oz)	Beer, 4 oz (dark, robust) Ovaltine and other beverage mixes Chocolate milk Cocoa
Meat & Meat Substitute 1 oz = 1 serving	Eggs 1 whole Cheese Beef, lamb, pork Poultry Seafood	Sardines	Baked beans canned in tomato sauce (1/3 cup) Peanut butter (1 tbs) Tofu