

# THE UROLOGY GROUP

www.urologygroupvirginia.com

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1860 Town Center Drive · Suite 150/160 · Reston, VA 20190 · 703-480-0220  
19415 Deerfield Avenue · Suite 112 · Leesburg, VA 20176 · 703-724-1195  
224-D Cornwall Street, NW · Suite 400 · Leesburg, VA 20176 · 703-443-6733  
24430 Stone Springs Blvd · Ste 100 · Dulles · VA 20166

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## KIDNEY STONE PREVENTION

The kidneys form the first part of the urinary system. They filter the blood to extract excess fluid and waste products. Urine, once made in the kidneys, travels through a tube on each side called a ureter to the bladder where it is stored until emptied to the outside.

Included within the materials filtered by the kidneys are minerals. Minerals are present in many of the foods that we eat. These minerals are absorbed during the process of digestion. The body uses the minerals that it needs, and the excess are excreted by the kidneys. Calcium, oxalate and uric acid are some of the minerals excreted by the kidneys.

Stones can form in the kidneys if an excess amount of calcium, oxalate or uric acid reaches the kidney at one time. If there is too much of one of these substances, it will not stay in solution in the urine. Rather, the minerals can join together and form crystals. Crystals can then join together to form a stone.

There are three core concepts to prevent stone formation: dietary awareness, adequate hydration and the use of inhibitors of stone formation. Dietary awareness can help reduce the risk for stones. See the Kidney Stone Prevention Diet.

Adequate hydration means taking in plenty of water or other liquids so that there is enough fluid to reach the kidneys. The kidneys can then make a dilute urine (not a concentrated urine) and stone formation is less likely. One needs to make sure that there is adequate fluid reaching the kidney to keep the urine dilute. A good rule of thumb is to drink two large glasses of water with each meal. The majority of calcium, oxalate or uric acid reaches the kidney after eating a meal. Two glasses of water with each meal allows plenty of fluid to reach the kidney so that these materials do not become too concentrated and crystallization does not begin.

A third concept available for preventing stone formation is to increase the level of inhibitors of stone formation. There are some medications which can be used which will raise citrate (not citric acid) level in the urine. A high level of urinary citrate is a natural inhibitor to stone formation. Recent studies have suggested that lemonade made from real lemon juice raises urinary citrate levels and may lessen the risk for stone formation.

Finally, for patients with uric acid stones, treatment with Allopurinol may be recommended. Allopurinol reduces the level of uric acid formed by the body, which reduces the amount that the kidney has to filter. Allopurinol treatment is effective for lessening the potential for uric acid stone formation, but does not provide any benefit for patients who form calcium oxalate stones.

## KIDNEY STONE PREVENTION DIET

**Fluids:** Drink ten 10 ounce glasses (3 liters, 3.2 quarts, 0.8 gallons) of water per day to decrease the risk of stone formation. If your urine is light and clear, you're likely drinking enough water.

**Maintain Calcium:** A normal calcium intake is recommended to prevent kidney stones. A diet with too much or too little calcium can increase your risk for stones. **Women** should take **1200 mg** of calcium per day. **Men** should take **1000 mg** of calcium per day. The best source of calcium is from your diet. If supplements are taken, they should be calcium citrate (instead of calcium carbonate) and be taken with or shortly after meals. To find out your current calcium intake, keep a **food diary** for one week. Once your diary is complete, increase, or decrease your current calcium intake in order to meet your calcium goal.

**Decrease Animal Protein:** Animal protein has a number of effects on the urine that increase risk for kidney stones. Switch to non-animal sources of protein such as beans, legumes, seeds and nuts. Aim for 50-70 grams of protein per day.

**Decrease Sodium:** Sodium intake results in increased calcium in the urine and increases your risk of kidney stones. Decreasing sodium may decrease your risk of kidney stones. Only 10-15% of your daily intake of sodium comes from the salt shaker. Most comes from processed foods, pre-packaged foods, canned foods, lunch meats and cheeses, fast food, sauces and condiments. Check food labels before buying.

**Increase Citrate:** Citrate makes potential stone building blocks dissolve better in the urine and prevents stone growth. Citrus fruits such as lemons, limes and oranges and vegetables are a natural source of citrate in the diet. **Homemade lemonade** is a great way to increase your fluid intake and get your citrate. Add 1/2 cup of fresh squeezed or concentrated lemon juice to 7 cups of water. Sweetener such as agave, sugar or sugar substitute may be added to taste. Avoid premade lemonade as it often contains a lot of sugar or high fructose corn syrup.

**Decrease Oxalate:** Since most calcium stones are composed of calcium oxalate, reducing your oxalate intake may decrease your risk of kidney stones. Some common sources of oxalate are spinach, rhubarb, beets, cocoa powder, peanuts and almonds.

**Achieve and Maintain a Healthy Weight:** Studies have shown a link between being overweight, diabetes and risk of kidney stones. Excess body weight and diabetes are associated with an increased risk of uric acid stones in particular. Achieve and maintain a healthy weight to decrease your risk of stones.

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Reference: Heilberg IP and Goldfarb DS: Role of diet in stone disease. Lesson 12, Volume 29. ©2010 American Urological Association Education and Research Inc., Linthicum, MD.