

Minimize Purine-Yielding Foods

FOODS HIGHEST IN PURINES

- anchovies
- brains
- gravies
- herring (including roe)
- liver (calf or beef)
- mackerel
- meat (beef, lamb, pork & ham, veal)
- meat, game (venison, etc.)
- meat soups & broths
- meat, beef extracts & by-products
- mussels
- organ meats (liver, kidney)
- sardines
- scallops
- yeast

FOODS MODERATELY HIGH IN PURINES

- asparagus
- breads & cereals, whole grain
- cauliflower
- eel
- fish (fresh & saltwater)
- legumes (kidney, navy & lima beans, lentils, peas)
- mushrooms
- oatmeal
- peas, green
- poultry (chicken, duck, turkey)
- shellfish (crab, lobster, oysters)
- spinach
- tongue
- tripe
- wheat germ & bran

FOODS LOWEST IN PURINES

- beverages (coffee, tea, sodas, cocoa)
- butter
- bread & cereal (except whole grain)
- cheese
- eggs
- fats
- fish roe (including caviar)
- fruits & fruit juices (avoid citrus)
- gelatin
- milk (including butter, condensed, malted)
- nuts (including peanut butter)
- pasta (evaluate sauce ingredients separately)
- sugars, fruit syrups, sweets (avoid chocolate)
- vegetables (except those above)
- vegetable & cream soups (made with acceptable vegetables, but not with beef stock)

Dipsticking to Monitor Stone Formers and Their Diets

Modern dipsticks are like litmus paper in high school chemistry. They are simple to use and show exact degrees of urinary pH. A quick dip into a dog's urine will indicate if the pH is **abnormally acidic** (how much below normal) or **abnormally alkaline** (how much above normal). By regularly dipsticking and keeping a diary of the results, any owner can monitor their Dalmatian to detect when and how long it is producing abnormally unstable urine, often much before crystals mature into stones.

Dipsticking is best done first thing mornings before feeding with fasting "first-catch" urine when the Dalmatian has been indoors and urine has sat overnight in the bladder. Some very conscientious owners also dipstick a few hours after feeding to compare differences in pH between fasting urine and that due to digesting the food formulation the Dal is fed.

The success or failure of preventative diets and drugs also can be monitored by dipsticking and the regimens modified if the Dalmatian's pH continues to be unresponsively abnormal.

OF SEVERAL PREVENTATIVE ANTI-URATE GOALS, ONE IS FOR THE DALMATIAN TO STABILIZE AT A PLATEAU OF NORMAL, IN THE RANGE OF URINARY pH 6.5 - URINARY pH 7.0

Dipsticks, also known as "chemstrips," can be purchased from your veterinarian or drug store. If those sources do not stock them, look in the yellow pages of your telephone directory under "Medical Supply Companies."

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EMERGENCY!

Dalmatian Cannot Pass Urine ("Urinary Obstruction")

- **Rush dog to your veterinarian or emergency clinic!**
Obstruction of the urinary pathway can quickly reach life-threatening status within 24 to 72 hours as urine relentlessly backs up into the dog's body system instead of being expelled out of it.
- Have dammed-up urine easily and immediately removed from bladder either by "cystocentesis" or by catheterization. Urine may be so drained several times while diagnosis and treatment are being evaluated. Tapping off urine "buys time."
- Have the type of stone forming diagnosed at once. Abnormal urinary crystals are identifiable under an office microscope. Urate crystals thrive in abnormally acidic urine. Struvite ("infection") crystals thrive in abnormally alkaline urine.
- Have x-rays confirm size, location of any stones but remind veterinarian the most commonly-seen urate stones in Dalmatians may not be seen via normal x-rays. Most urates require "**indirect radiography**" or ultrasound to be visualized.

- Non-surgical clearing of the obstruction can be often accomplished by "**uropropulsion**" whereby, under anesthesia, the stones are flushed back up into the bladder. The newest adaptation, also under anesthesia, is "**voiding uropropulsion**" which instead of backflushing, expels the stones out of the dog's bladder. If other stones continue to move down and quickly re-obstruct, then surgery may be unavoidable to restore lasting urinary flow. If so, request Isoflurane or other newer anesthetics with less anesthetic risks. Note "**urethrostomy**" is **not simple stone-removal surgery!** It is a surgically-created, irreversible urinary opening and should be considered a last resort after all other anti-stone procedures have failed. It should be performed only by a member of the American College of Veterinary Surgeons (who must be "Board certified" for membership) and is experienced in performing urethrostomies.
- Have Dalmatian started on antibiotics for existing urinary infection or to prevent the onset of one.
- Shift the stone former to distilled water, only.
- Rush specimens (stones passed/catheterized or removed surgically - or sediment centrifuging out during urinalysis) to one of the two urinary stone centers listed in this pamphlet who will confirm assay by electron microscopy, chromatography and other highly specialized testing procedures. (Minnesota Urolith Center does not charge.)

Introduction

Dalmatians and mostly all other dog breeds form urinary stones. Some stone-forming dogs, Dalmatians included, live out their lives happily without ever revealing any symptoms, according to U.S. veterinarian specialists in urinary stone problems. Many other Dalmatians never become stone formers at all.

Today, stone-forming dogs can easily and successfully be treated - the benefit of 25 years' experience of research and findings in this health problem. Accumulated knowledge improving diagnosis and treatment provides methods even to avoid surgery which used to be the only treatment, but no longer is. These advances are largely from two U.S. centers specializing in urinary stones: (1) the Minnesota Urolith Center at the School of Veterinary Medicine of the U. of Minnesota, and (2) the Urinary Stone Analysis Laboratory at the School of Veterinary Medicine of the U. of California at Davis (names, addresses and telephones cited elsewhere in this pamphlet).

The breed-specific "urates/purines" making up most (not all) Dalmatian stones may best be prevented by diet and probably by type of water intake. Paralleling advances in veterinary knowledge, anti-urate food formulations have also evolved. One - Hill's u/d® - is available only from vets as dry or canned. After being weaned from puppy diets, maturing and adult Dalmatians can be fed now from a choice of non-beef, non-meat dogfoods such as vegetable-and-rice or turkey-and-barley and go their entire lives without forming urate stones. In other Dalmatians, urate stones already formed can be successfully dissolved non-surgically with an anti-urate drug, allopurinol, and the prescription u/d® dogfood. For the few resistant cases for whom stone-removal surgery is unavoidable, modern anesthetics for dogs such as Isoflurane provide no more threatening anesthetic risks than appendix removals in humans.

Why Do Some Dalmatians Form Urinary Stones?

Dalmatians, humans and apes are unique in the way they metabolize purine-yielding foods. Not every human will form purine/urate stones and neither will every Dalmatian.

More important than the amount of dietary protein contributing to the problem is the type of protein particularly those dog food formulations

containing large amounts of purine-yielding foods. For feeding a confirmed urate stone former, liver and other organ meats are undesirably very high as purine-yielders whereas other foods like eggs and most vegetables and fruit are desirably low as purine-yielders.

When the diet of some humans is high in purines, they develop gout or kidney stones. When the diet of some Dalmatians is similarly high, they develop urate stones in their urinary tract. Dogfoods with high amounts of beef and meat or their "by-products" should be avoided for the Dalmatian who has been diagnosed with urate urinary crystals/stones.

FEEDING PURINE-CONTAINING TABLE SCRAPS TO DALMATIANS IS PERHAPS ONE OF THE WORST DISSERVICES TO THEIR NORMAL GOOD HEALTH !

Of all stone-forming Dalmatians, the vast majority form urates/purines but a few may form other types. Treatment of one type of stone may worsen another type so an essential first step is a dependable assay by an experienced laboratory if treatment and prevention of future stone forming is to be successful and not misguided.

Urate stones may be composed of one or more of several purines. Over 90 percent of all stone-forming Dalmatians produce "ammonium acid urate," a purine stone very responsive to simple non-surgical treatment. A conscientious program of anti-urate medication and anti-urate diet can be highly effective for both treatment and especially for prevention of recurrences.

The number one type of stone in other dogs is "struvite," so identified with urinary tract infections they are nicknamed "infection stones." The treatment of infection stones vs. Dalmatian-specific urate stones is totally different and underscores the importance for - first - accurate assay of the type of urinary stone being formed if treatment of the Dalmatian is to be successful.

Urinary stones in dogs are found in the "upper" system (e.g., the kidneys), or in the "lower" urinary system (e.g., the bladder). Data collected for 15 years from some 2,800 stone-forming Dalmatians showed 97 percent of their urinary stones were found in the lower system where treatment and maintenance is simpler and more successful than for those in the kidneys or elsewhere in the upper, renal system.

How is a Stone Former Detected?

A standard urinalysis generally shows if abnormal crystals are forming in the urine long before the crystals "grow up" to become stones which then may reach a size large enough to create the dreaded urinary obstruction in males. Urinary pH showing persistent and unchanging abnormal acidity vs. alkalinity is another sign.

If no diagnostic tests ever are done, stone forming may progress to show symptoms more obviously detectable in male dogs than those in females, perhaps because of the marked difference in their gender's normal urinary anatomy. As a large enough stone is carried down the urinary pathway, it can lodge within the male dog's penis at a damlike narrowing of a cartilage, the "os penis." (The same size stone may pass uneventfully through the urinary anatomy of female dogs.)

When normal urine flow is obstructed by a stone, the male dog revealingly will strain to urinate. No urine will pass or only a few drops. The dog will repetitively attempt to urinate with little or no result. Urinary obstruction in male dogs is thus very visible to the observer aware of these signs and regularly watching for them.

Females with stones may demonstrate symptoms similar to those of urinary infections, namely more frequent urinating, "accidents" by housebroken bitches and very frequent licking of their genital area. (Because these are similar symptoms to simple urinary infections, do not become concerned unless results of a urinalysis confirm abnormal crystals and/or abnormal pH.)

After unproductive attempts, some stone-forming dogs will succeed with a sudden outpouring of urine. In such cases, it is likely that the stone creating the obstruction was "passed" thereby opening and restoring the normal flow and pathway of urine. Any obstructed dog, even those who quickly pass stones, should be seen by their veterinarian for workup and to embark immediately on a preventative program of anti-stone medication with the proper anti-stone diet.

General Preventative Guidelines for Stone-Forming Dalmatians

- Have your vet perform a routine, inexpensive urinalysis periodically. If centrifuging spins out sediment ("sand" or "gravel") from the urine specimen, send it - not the liquid - for assay to one of the two U.S. urinary stone centers, addresses cited elsewhere.

- Obtain fresh urine for testing in a clean and chemically-inert container, such as glass. Avoid obtaining a sample shortly after Dal has recently urinated when crystals or stones may have been already flushed out. Instead, obtain a fasting specimen as "first catch" in A.M. before feeding (after urine has sat un-emptied in the bladder overnight). Deliver urine to vet promptly. ~~Do not refrigerate~~ to avoid temperature-induced crystals forming deceptively as the urine specimen cools from body temperature.

- One major goal of prevention is to maintain a normal plateau of urinary pH 6.5 to 7.0. Dipstick fasting urine from stone formers frequently and keep a diary of pH readings.

If the pH falls into the acidic area of pH 6.0 or less, below normal and stays there over several dipstickings, consider re-evaluating the Dal's diet and drugs and consult with your vet for perhaps additives to alkalinize the unchanging, persistently acidic urine.

If the pH remains up in the alkaline area of 8.0 or higher above normal over the course of several dipstickings, contact your vet to rule out a possible urinary infection.

- Stone formers should perhaps drink only distilled water for their entire lives. It is inexpensive and available in any supermarket where bottled water is stocked. Make sure labels specify "distilled" water. (Many faucet filters affect only the taste of water but do not distill out many unwanted particles).

- Crystal and stone formation accelerates in stagnant urine. Permit the Dalmatian to urinate as frequently as possible (at least every 4-5 hrs.) permitting the bladder to be flushed of crystals before they can progress into larger stones capable of obstructing.

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The latest teaching textbooks for graduate veterinarians and vet journal articles on canine stone forming were the sources of the information.
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