

## Bladder Stones

A DNA test for Hyperuricosuria (HUU) to find the gene which is implicated in the development of URATE stones has been developed which work with Bulldogs and many other breeds including Black Russian Terriers, Jack Russells. Dalmatians all have a copy of the affected Gene within the makeup of the whole breed. However extensive research has revealed that although all Dalmatians carry the affected gene only 30% will go on to develop URATE stones and that more research is needed to analyze why Gene Affected dogs don't all develop the problem; it's thought another as yet unknown factor, is involved.

## Urinary Calculi or Bladder Stones

- **Introduction**

This fact sheet covers conditions relating to the formation of stones or gravel in the urine in both dogs and cats, a condition sometimes referred to as urolithiasis.

- **The Urinary tract**

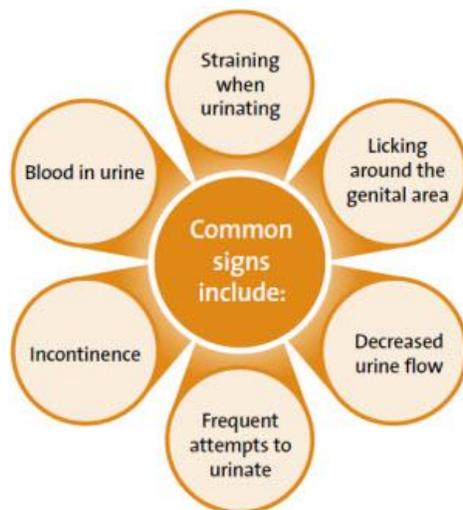
Both dogs and cats commonly suffer from urolithiasis and associated urinary tract symptoms. Gravel is a particular problem in cats, whilst stones are more commonly seen in dogs. They can cause a variety of problems, particularly recurrent bouts of cystitis, difficulty passing urine and incontinence. Occasionally, much more serious problems can arise, such as blockage of the urethra. Urine is formed by the kidneys when the blood is filtered to remove waste products. Urine passes from the kidneys through two tubes called the ureters, to the bladder, where it is stored. When your dog or cat urinates, the bladder contracts and the urine passes out through a larger single tube called the urethra.

- **Bladder stones in the dog**

Stones form in the bladder when minerals dissolved in the urine form crystals, which then amalgamate and form uroliths, small gravel like particles or stones. These can vary quite considerably in size, ranging from minute stones that can barely be seen, to those the size of a small orange. The stones form for a variety of reasons; often there is no one single cause. However, urinary tract infections, stress, high levels of certain substances in the diet, low water intake and situations where an animal is not given the opportunity to urinate at will, can all increase the chances of a problem arising. Some breeds of cats and dogs are especially prone to bladder stones. The age and sex of the animal also play a part.

- **Signs & Symptoms**

In most, but not in all cases, the presence of stones or gravel will cause some clinical signs, depending on the type and size of the stones and the age and sex of the dog. Cystitis is the most common symptom, caused by the stones rubbing and irritating the lining of the bladder. You may notice that your dog wants to pass small amounts of urine (sometimes containing blood) more frequently. Passing urine can be quite painful and you may see some straining or discomfort. Cystitis can be treated

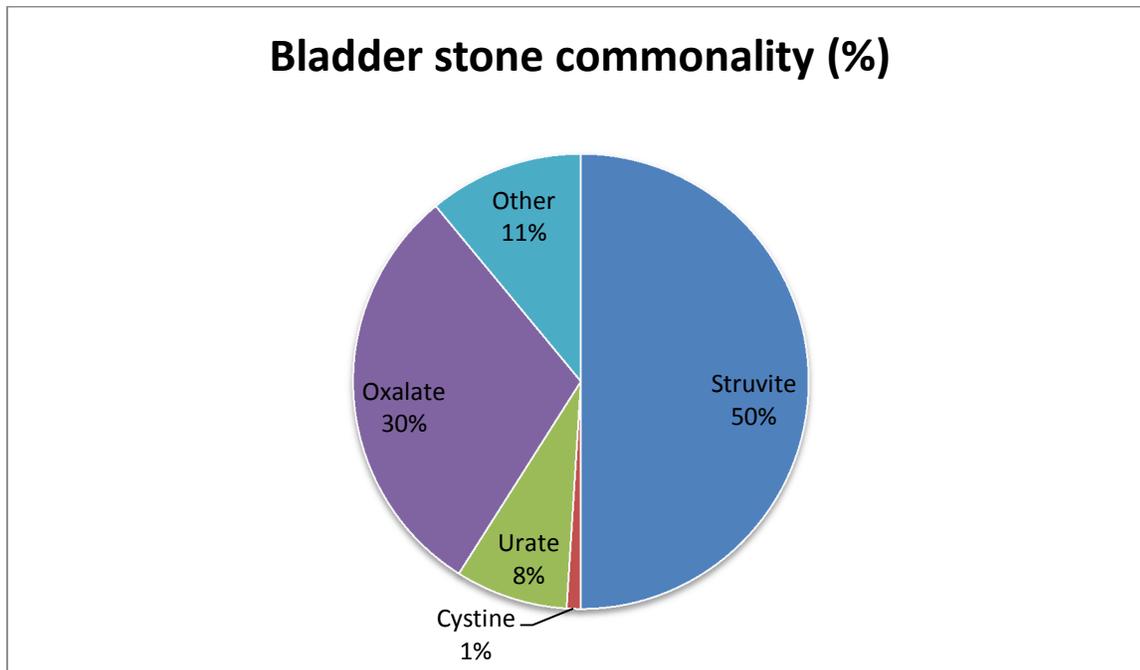


conventionally with antibiotics, normally clearing the infection quickly. However, if the problem fails to respond to treatment or becomes recurrent, then it would be wise to investigate the possibility of bladder stones.

In some cases, incontinence is the only apparent sign. Straining and the constant need to pass urine are absent and the only symptom is leakage or dribbling of urine whilst your dog is lying down.

In males, due to the fact that the urethra is narrow, it is possible for small stones to become lodged part way down, blocking the flow of urine. This is potentially a very serious situation, which can lead to rupture of the bladder or kidney damage. Prompt treatment from your vet is always necessary where an obstruction is suspected. This situation is much less likely with a bitch, as the urethra is larger in diameter. You may, however, see small stones passed intermittently.

**Bladder stones are made up of a variety of different components and are grouped accordingly:**



The most common type of stone is composed of **struvite**, a mixture of magnesium, ammonium and phosphate. **Struvite** accounts for about 50% of bladder stones and is the most common type of stones seen in bitches.

Less common types of bladder stone include **oxalate** (30% of all stones) **urate** (8% of all stones) which is found in Dalmatians, and **cystine** (1% of all stones). All three occur predominantly in males.

The symptoms exhibited by your dog may lead your vet to suspect bladder stones and to confirm his suspicions he may decide to carry out X-rays. Most bladder stones will show up on X-rays if of sufficient size to be seen. Unfortunately, it is often difficult to spot very small stones or gravel. A urine sample can also be very helpful, as the pH (acidity/alkalinity) of the urine is a valuable guide.

Struvite stones normally form in alkaline urine, whereas cystine and urate normally form in acid urine. Oxalate stones can form in either. Some dogs can have a mixture of different stones. Depending on the type and number of stones, there are several different ways of dealing with the problem. In the past, stones were always removed surgically and although this is still the usual course of action for oxalate and cystine stones.

It is possible to dissolve away other types using special diets. Your vet will be able to advise you on the best course of action and supply any specialised diet. On average, it will take about eight weeks to dissolve stones, during which time you must keep strictly to the diet. In general, increasing the fluid intake of your dog will help in the management of all types of stone.

**Diet is extremely important in preventing recurrence once the stones have gone.**

What you will need to will vary with the type of stones:

- For Struvite the diet needs to be; Low in magnesium and phosphorus. Have a reduced level of protein. Excess protein is broken down into ammonia, another constituent of struvite.
- For Oxalate the diet should be: Moderately restricted in calcium, protein and sodium.
- For Urate the diet should be: Restricted in protein.
- For Cystine: An increase in fluid intake is recommended.

As well as food prescribed by the Veterinary Profession, the company Denes manufactures special diets and provided the above definition of Canine Stones.

Some Bulldog owners have tested and discovered that some dogs in the breed carry the gene which is implicated for this condition. It Exists as a carrier or affected gene but as can be seen from the Dalmatian research at the beginning of this article being tasted as carrying an Affected gene does not always mean the dogs will go on to form the urate stones.

From the descriptions of this condition it is extremely painful for the dog and we are not at all in favour of ignoring the possibility of this becoming a problem in Bulldogs. Our advice has always been that any breeder getting any problems in their dogs for stones of any kind should seek veterinary advice and test to see what type of stone condition it is.

They only available DNA test that can tell us in advance of a dog is clear, is a carrier, or carrier the affected gene in bulldogs is for Urate stones, as yet there is no available test for the Cystine Stones. Some breeders have tested their dogs a wish to know about the mating protocol involved in breeding out the affected gene and carrier genes. Please read the text below of "Breeding Strategies" which provides a table that explains how one breeds out a condition in simple terms and can be applied to any hereditary recessive gene problem.

The Kennel Club have formed a data base to carefully record the dogs passed as clear, carrier of affected for future reference, however without a knowledge of how genetics work interpretation of the published results must be discussed with a vet.

**An advisory note from our Veterinarian.**

Because you test for this gene which could lead to the formation of the Urate stones condition and find your dogs clear you must be extremely careful not to advertise puppies as being 'clear from stones' because there is no guarantee that the other types of stones may not develop in the dogs future life some stones are definitely environmental so you would be able to Litigation.

Laboratories who are able to test for this condition:

- [Animal Health Trust](#)
- [Laboklin](#)
- [Animal Diagnostics](#)

**Breeding Strategies**

DNA test findings can be extremely valuable when developing and implementing your breeding plans.

Interpreting Your DNA Test Results for Autosomal Recessive Diseases

There are three possible test results: Clear, Carrier, and Affected. Below is a description of what each result means to you as a breeder.

- **Clear** - This finding indicates that the gene is not present in your dog. Therefore, when used for breeding, a Clear dog will not pass on the disease gene.
- **Carrier** - This finding indicates that one copy of the disease gene is present in your dog, but that it will not exhibit disease symptoms. Carriers will not have medical problems as a result. Dogs with Carrier status can be enjoyed without the fear of developing medical problems but will pass on the disease gene 50% of the time.
- **Affected** - This finding indicates that two copies of the disease gene are present in the dog. Unfortunately, the dog may be medically affected by the disease. Appropriate treatment should be pursued by consulting a veterinarian.

**Helpful Canine Breeding Chart**

The chart provided below outlines the implications of various breeding pair combinations. Remember, it is always best to breed "Clear to Clear". If followed by all breeders, these strategies will ensure a significant reduction in the frequency of the targeted disease gene in future generations of dogs. However, to maintain a large enough pool of good breeding stock, it may be necessary for some breeders to breed "Clear" to "Carriers" (see below).

	Clear Male	Carrier Male	Affected Male
Clear Female	100% Clear	50/50 Carrier/Clear	100% Carrier
Carrier Female	50/50/ Carrier/Clear	20/50/25 Clear/Carrier/Affected	50/50 Carrier/Affected
Affected Female	100% Carrier	50/50/ Carrier/Affected	100% Affected



- **Yellow** - Ideal Breeding Pair Puppies will not have the disease gene (neither as Carrier nor as Affected).
- **Blue** - Breeding Is Safe, No Affected puppies will be produced. However, some or all puppies will be Carriers. Accordingly, it is recommended that Carrier dogs which are desirable for breeding be bred with Clear dogs in the future, which will produce 50% carrier and 50% clear animals, to further reduce the disease gene frequency. These offspring should be tested by DNA test for this defective gene, and if possible, only the clear animals in this generation should be used.
- **Pink** - High Risk Breeding Some puppies are likely to be Carriers and some puppies are likely to be Affected. Even though it is possible that there will be some clear puppies when breeding "Carrier to Carrier", in general, neither this type of breeding pair nor "Carrier to Affected" are recommended for breeding.
- **Purple** - Breeding Not Recommended All puppies will be genetically and and maybe medically affected.

The Kennel Club keep maintain a record of all dogs tested in the registered names.

- [ Clear - <https://www.thekennelclub.org.uk/media/232739/bulldogusdclears.pdf> ]
- [ Carrier - <https://www.thekennelclub.org.uk/media/232743/bulldogusdcarriers.pdf> ]
- [ Affected - <https://www.thekennelclub.org.uk/media/232747/bulldoghuuaffecteds.pdf> ]

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