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it stops. Surgery is not the best option for all patients; however, those with urethral obstruction and those with bacterial infections associated with the stones should be operated upon unless there are other health conditions that prohibit surgery.

The second option is to dissolve the stone with a special diet. This avoids surgery and can be a very good choice for some dogs. However, it has three disadvantages.

1. It is not successful for all types of stones. Unless some sand-sized stones can be collected from the urine and analysed, it is not possible to know if the stone is of the composition that is likely to be dissolved.
2. It is slow. It may take several weeks or a few months to dissolve a large stone so the dog may continue to have haematuria and dysuria during that time.
3. Not all dogs will eat the special diet. The diet is not as tasty as the foods that many dogs are fed. If it is not consumed exclusively, it will not work.

Most dogs having bladder surgery are kept in hospital for 2 or 3 days. Your dog will be admitted on the morning of surgery after fasting from 9 p.m. the night before. You will need to keep your dog very quiet for a month after the surgery. Stitches are removed 10 days after the operation. Dogs are often sent home on antibiotics and a special diet. You must watch your dog closely for blood in the urine or straining.

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# Bladder stones in dogs

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*Client information series*

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# Bladder stones (cystic calculi, uroliths)

## **What are bladder stones?**

Bladder stones are rock-like collections of minerals that form in the urinary bladder. They may occur as a large, single stone or as collections of stones the size of large grains of sand or gravel.

## **Are these the same as gall stones or kidney stones?**

No. Gall stones are in the gall bladder, and kidney stones are in the kidney. Kidney stones are usually unrelated to bladder stones.

## **What problems do bladder stones cause?**

The two most common signs of bladder stones are haematuria (blood in the urine) and dysuria (straining to urinate). Haematuria occurs because the stones irritate the bladder wall, causing bleeding from its surface. Dysuria occurs when stones obstruct the passage of urine out of the bladder. When an obstruction occurs, the bladder cannot be emptied and this is very painful. Your dog may cry in pain, especially if pressure is applied to the abdominal wall.

## **Why do they form?**

There are several theories to explain the formation of bladder stones. There is probably more than one cause in each individual dog. The most commonly accepted theory states that one or more stone-forming crystalline compounds is present in elevated levels in the urine. This may be due to abnormalities in **diet** or due to some previous disease in the bladder, especially **infection** with bacteria. Sometimes the condition may be due to a fault in body chemistry. When the amount of this compound reaches a threshold level it precipitates and forms tiny crystals. These crystals stick together, usually due to mucus-like material within the bladder, and stones gradually form. As time passes, the stones enlarge and increase in number.

## **How fast do they grow?**

Although it may take months for a large stone to grow, some sizeable stones have been documented to form in as little as two weeks.

## **How are they diagnosed?**

Most dogs that have bladder infections do not have bladder stones. These dogs will often have blood in the urine and will strain to urinate, the same symptoms as a dog with bladder stones. Therefore, we do not suspect bladder stones just based on these clinical signs. Some bladder stones can be palpated (felt with the fingers) through the abdominal wall. However, failure to palpate them does not rule them out. Most bladder stones are visible on radiographs (x-rays) or an ultrasound examination. These procedures are performed if

stones are suspected. This includes dogs that show unusual pain when the bladder is palpated, dogs that have recurrent haematuria and dysuria, or dogs that have recurrent bacterial infections in the bladder. Some bladder stones are not visible on Xrays. These stones may be found with an ultrasound examination (if available) or with special Xrays that are made after placing a special dye (contrast material) in the bladder.

## **Can bladder stones be prevented?**

Sometimes. There are at least four types of bladder stones, based on their chemical composition. If stones are removed surgically or if some small ones pass in the urine, they should be analysed for their chemical composition. This will permit us to determine if a special diet will be helpful in preventing recurrence. If a bacterial infection causes stone formation, it is recommended that periodic urinalyses and urine cultures be performed to determine when antibiotics should be given.

## **How are bladder stones treated?**

There are two options for treatment. The fastest way is to remove them surgically. This requires major surgery in which the abdomen and bladder are opened. Following two to four days of recovery, the dog is relieved of pain and dysuria. The haematuria will often persist for a few more days, then