Salivary Gland Stones (Salivary Calculi)

One or more stones sometimes form in one of the salivary glands. A stone can cause a blockage of the flow of spit (saliva), which can lead to pain and swelling of the affected salivary gland. The reason why these stones form is not known. Sometimes a stone comes out into the mouth on its own, or with gentle probing. However, in many cases a small procedure is needed to remove the stone.

What are the salivary glands?

The salivary glands make spit (saliva). Saliva is important in the breaking down of the food that you eat. It makes food moist, lubricating it as it passes from the mouth to the gullet. It also contains chemical substances (enzymes) which break down some of the starch and fat in your food.

There are three pairs of glands that make saliva. Saliva drains into the mouth from these glands down short tubes (ducts).

- **The submandibular glands** are under the floor of your mouth - one on each side - and drain saliva up into the floor of your mouth.
- **The parotid glands** lie just below and in front of your ears. Saliva passes down the parotid duct into the inside of your cheeks.
- **The sublingual glands** are just beneath your tongue.

You make small amounts of saliva all the time to keep your mouth moist. When you eat, you normally make much more saliva which pours into your mouth.

What are salivary gland stones?

The chemicals in spit (saliva) can sometimes crystallise into a stone that can then block the salivary ducts. Some people form one or more small stones in a salivary gland. This occurs most commonly in people between the ages of 30 and 60 years, although it can occur at any age. It is more common in men than in women.

The reason why a stone forms is not known. A **salivary gland stone** is sometimes called a sialolith or a salivary calculus. Most salivary stones are mainly made of calcium. However, there is no abnormality of the blood calcium level or any other problem with calcium in your body. Some research suggests that changes in the flow of saliva through the gland are connected with the formation of stones. Salivary gland stones are not usually associated with any other diseases.

The size of the stone can vary from less than 1 mm to a few centimetres in diameter. About 9 in 10 stones are less than 10 mm in size.
Where do salivary gland stones occur?

Most (about 8-9 in 10) salivary stones form in one of the submandibular glands. The submandibular duct is a tube, which runs from under the front of the tongue to the submandibular gland. The larger parotid glands make spit (saliva) that is thinner than that produced by the submandibular glands. This means that stones less commonly form in parotid glands. It is rare for a stone to form in a sublingual gland.

What are the symptoms of salivary gland stones?

When spit (saliva) cannot exit a blocked tube (duct), it backs up into the gland, causing pain and swelling of the gland. The most common symptoms are pain and swelling of the affected gland at mealtimes. This occurs if the stone completely blocks a duct. The saliva cannot pass into your mouth if the duct is blocked by a stone. The pain can be sudden and intense just after starting a meal. Swelling soon follows. The pain and swelling ease over about 1-2 hours after a meal.

However, most stones do not block a duct completely. A stone may only partially block saliva flow or not block the flow at all if it is embedded in the body of the gland. In these situations the symptoms can vary and include one or more of the following:

- Dull pain from time to time over the affected gland.
- Swelling of the gland. Swelling may be persistent or vary in size from time to time.
- Infection of the gland may occur causing redness and pain. This may develop into a ball of infection and pus (an abscess) and make you feel quite unwell.

Some people with salivary gland stones have no symptoms at all. A stone may be found by chance on an X-ray picture taken for another reason.

Are any tests needed?

Symptoms are often typical and the diagnosis is usually clear. A doctor can sometimes feel or see a stone at the opening of a tube (duct). Usually an ultrasound scan is helpful. In some cases, other tests may be needed. The test done may be one of the following:

- A different type of scan such as a CT scan or MRI scan.
- Sialography (sialogram). This is a special X-ray test. It helps to show up the gland, the duct and any abnormalities of the duct, such as a stone. For this test a small plastic tube is passed into the affected duct. A dye is then injected into the salivary gland. The tube is removed and X-ray pictures are taken. The X-ray pictures show up the dye within the gland and duct. This gives a good outline of the structures and shows up any abnormalities.
- Sialendoscopy. In this test a very thin tube (endoscope) with a tiny light and camera at the tip is inserted into the salivary duct. The doctor can then see directly into the duct and gland to see if a stone is present.

What is the treatment for salivary stones?

Most stones that cause symptoms will not go away unless they come out or are removed. Sometimes a small stone comes out into the mouth by itself. If that does not occur, possible treatment options and procedures include the following:

- **Gentle probing** into the tube (duct) from inside the mouth with a thin blunt instrument can sometimes free a stone which then falls into the mouth. This is done by a doctor.
- **Therapeutic sialendoscopy.** This is a similar procedure to that described above. It also uses a very thin tube (endoscope) with a camera and light at the tip. The tube is pushed into the duct. If a stone is seen, then a tiny basket or pair of grabbers attached to the tube is used to grab the stone and pull it out. This technique can successfully remove about 17 in 20 stones. Local anaesthetic is usually injected into the duct first to make this procedure painless. In some cases, where the stone is rather large, the stone is broken up first and the fragments are then pulled out.
- **A small operation** to cut out the stone is the traditional treatment but is done less and less, as therapeutic sialendoscopy has become available. It may still be needed if therapeutic sialendoscopy is not an available option, or if it fails.
- **Shock wave treatment** (lithotripsy) may be an option. This uses ultrasound waves to break up stones. The broken fragments then pass out along the duct. This is a relatively new treatment for salivary stones (although it has been used for many years to treat kidney stones). However, it is not done commonly. Sometimes shock waves are used to break up a large stone when therapeutic sialendoscopy is done to make smaller fragments which can be more easily removed.

A salivary stone is usually a one-off event. After it is removed there are usually no further problems. However, some people develop one or more further stones at some later time. Sometimes several stones form in the same gland. An operation to remove the whole gland may be an option for people who develop recurring or multiple stones. (You will make enough spit (saliva) from your remaining glands if one is removed.)

Can recurrent stones be prevented?

As the exact cause of salivary stones is not known, there is no clear way to prevent them. However, it is important to drink plenty of fluids, especially if you exercise frequently or live in a warm climate.

Further reading & references
- Therapeutic sialendoscopy; NICE Interventional Procedure Guideline, May 2007
- Neck lump; NICE CKS, January 2016 (UK access only)

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