

## **Dry mouth (also known as Xerostomia)**

### **What this article covers:**

- The salivary glands
- What saliva does
- Symptoms of reduced saliva
- Results of reduced saliva
- Causes of reduced saliva
  - Dehydration
  - Drug side effects
  - Result of certain medical conditions
  - Result of radiation therapy for head and neck cancer
- Need for careful dental examination in head and neck radiation therapy patients
- The danger of osteo-radio-necrosis (ORN) in head and neck radiation therapy patients
- Hyperbaric oxygen therapy for head and neck radiation therapy patients to prevent ORN
- Early and regular dental examination of Xerostomia patients
- Xerostomia and age-related dental diseases
- High standard dental examination and care are essential for the elderly

### **Dry mouth....**

A dry mouth results from a reduced flow of saliva from one or more of the primary salivary glands. The condition is known as Xerostomia.

### **The salivary glands....**

There are three pairs of major salivary glands and multiple small accessory salivary glands supplying saliva to the mouth. The largest of these glands are the Parotid salivary glands situated in the area of the back of the cheek around the jaw. The next salivary glands are the sub-mandibular glands located in the floor of the mouth beneath the tongue towards the back of the mouth. The smallest of the major salivary glands are the sub-lingual salivary glands located in the floor of the mouth at the front of the mouth. The accessory salivary glands are located throughout the mouth in the soft tissues of the cheeks, lips, and in the palate.

### **Functions of saliva....**

The saliva performs many functions including lubrication of the oral soft tissues to prevent trauma, lubrication of food as preparation for swallowing, lubrication of the tongue and lips for speech, supply of various enzyme systems that act to protect the mouth from infection, buffering of the acid-alkaline balance of the mouth after the consumption of sugars, and through these multiple actions it maintains a healthy environment in the mouth.



### **Symptoms of xerostomia (dry mouth)....**

There are a very large number of signs and symptoms of a dry mouth and one or more may be present that may indicate the need for an assessment of saliva adequacy. The list below describes several of these signs and symptoms but is not necessarily a complete list.

- Dry tongue
- Fissures of the tongue
- Scalloping of the margins of the tongue
- Smoothness of the tongue
- Sensitivity of the tongue to spices and strong tastes
- Dry lips and dry corners of the mouth
- Weeping raw corners to the mouth (*angular cheilitis*)
- Redness of the gums around the front teeth especially in mouth breathers
- Fine bubbles throughout the saliva like a froth
- Insufficient saliva to chew dry food
- Insufficient saliva for comfortable swallowing
- A feeling of a burning sensation in the mouth
- Redness and tenderness around salivary ducts in the mouth
- Infection of the salivary ducts
- Recurrent swelling of the salivary glands
- Bad breath
- Difficulty speaking
- Spitting fine frothy saliva when speaking
- Plaque build up
- Inability to clear food debris from the mouth
- Collection of food particles around the teeth and cheeks
- Rubbing of a denture causing soreness
- Inability to wear and denture
- Mouth ulceration

### **Bacterial numbers and activity....**

If the production of saliva is reduced, then the salivary antibacterial enzyme systems will be reduced in quantity and as a consequence of this reduced antibacterial activity in the mouth, the number of bacteria will increase.

In the presence of a reduced flow of saliva to clear food from the mouth, a greater volume of food debris is retained in the mouth.

With the increased bacterial plaque present, and greater food debris, the bacteria act on the sugars in the food debris fermenting them into acid. As a result the acid-alkaline balance of the mouth moves towards an acid environment.

These environmental changes will promote the activity of dental decay, and may increase the potential for oral infections including gum disease.



### **Reasons for less saliva....**

There are several reasons why the production of saliva can be reduced. These include dehydration, secondary effects of medication, medical disease and secondary to radiation therapy. The reasons for reduced salivary production include:

- A blockage of the direct nerve innervation of the salivary gland tissue by certain drugs
- salivary gland tissue becomes irreversibly damaged leaving less active glandular tissue to produce saliva in the future.

### **Dehydration....**

The most common and benign is a mild degree of dehydration that can arise due to excess fluid loss over fluid intake. In the tropics people sweat and depending on the level of physical activity, a significant increase in water consumption should take place. If mild dehydration is present, then the body closes down those processes that allow the body to lose water. This includes the reduction of urine output, and the reduction of liquid secretions such as tears and saliva.

### **Medication side effects....**

The next most common reason for a dry mouth is the result of a side effect of medications taken by the patient. There are many drugs that cause this side effect including sedatives, drugs used for the treatment of depression and anxiety, drugs used for the treatment of Parkinson's Disease, antihistamines, drugs used for the treatment of various mental illnesses, drugs used for the treatment of increased blood pressure and a number of pain killers. Those patients taking a number of these different medications are likely to suffer more pronounced reduction in salivary output and will therefore have a drier mouth.

### **Result of medical conditions....**

There are also a several medical conditions that can result in a reduction in salivary flow. Certain autoimmune diseases adversely affect the salivary gland tissue. These diseases are a result of the immune system turning against some tissue of the body by incorrectly recognising that tissue as a foreign tissue. These autoimmune conditions include Rheumatoid Arthritis, Sjogrens Syndrome, Systemic Lupus Erythematosus, kidney disease, Parkinson's disease, Anorexia and Bulimia, anxiety and depressive illness.

### **Head and neck radiation therapy....**

Head and neck cancer is often treated by surgery and then followed up with radiation therapy. The damaging effects of radiation are important in killing off any residual cancer cells. In the same way it will cause damage to any other cells in the path of the radiation beam.

When radiation is directed to a particular location within the head and neck, there is always some "scatter" of the radiation and this scatter can also cause



cellular damage to the surrounding tissues. The importance of this secondary radiation damage is that the local tissues affected by the scatter may include

salivary glands. This will result in the fibrosis of the glandular tissues so that the small glandular sacs producing saliva become obliterated with connective tissue or fibrous tissue that is incapable of manufacturing saliva. The result is a reduction in saliva production and therefore a dry mouth results known as post-radiation xerostomia.

### **Preventive dental examinations and treatment for radiation therapy patients....**

Patients who are due to undergo radiotherapy of the head and neck region should always be given a detailed dental assessment and all caries (decay) treated and any impacted teeth, or teeth with a doubtful future should be removed prior to radiation therapy. The proactive treatment of dental disease is extremely important in radiation therapy patient for two reasons:

- Post-radiation reduction in saliva....

Firstly, the post-radiation reduction in saliva will lead to an increase in dental caries activity and both old caries and new caries will progress far more quickly in the absence of the protective effects of saliva. The protection provided by saliva is the result of various "lysozyme" enzyme systems that help to attack bacterial cell walls causing the bacteria to burst; a process called lysis.

- Osteo-radio-necrosis....

The second reason for this proactive approach is that any bone that receives either primary beam or secondary scatter radiation will suffer a reduction in blood supply due to the obliteration of the small blood vessels within the bone. Any subsequent trauma to the bone will result in irreversible damage to the bone, reduced healing potential and necrosis (death) of the bone adjacent. This is called osteo-radio-necrosis (ORN).

### **Hyperbaric oxygen therapy....**

It is very important that patients who have undergone head and neck radiation therapy and who subsequently require dental surgery or tooth extractions are treated with high pressure oxygen therapy (hyperbaric oxygen therapy) to encourage new blood vessels to form in their jaw and to thereby re-establish an acceptable blood supply to the bone to prevent ORN occurring.

### **Early examination and treatment in xerostomia....**

It is important for everyone to undergo regular dental examination to identify dental disease at the earliest possible time to minimise the treatment required. In patients who suffer from xerostomia, it is even more important that they are examined for dental disease on a more regular basis than patients with no predisposing factors for dental decay or gum disease.



### **Xerostomia and gum disease....**

Those patients who have a dry mouth and gum disease will experience gum recession and this in turn exposes the root surface of the teeth to the mouth cavity and to the bacterial plaque that exists in all our mouths.

The root surface, having no enamel covering, is comprised of dentine that is softer than enamel and far less resistant to decay than enamel. The result of root exposure is that these patients suffer from root surface decay and this condition has been found to progress far more quickly than the decay normally seen on the crowns of teeth.

### **Dry mouth and age-related dental disease....**

Patients who suffer from xerostomia are very often older patients with a significant medical history and who take a number of medications. With advancing age, people often suffer from gum recession and the combination of this age-related or gum disease related recession and a reduced salivary output with reduced protection against the bacterial plaque, will result in a fast progressing destruction of the teeth due to dental decay of the exposed dentine of the root surfaces.

### **The problems of inadequate dental care in the elderly....**

Patients who have previously looked after their natural teeth over the years can find themselves suddenly suffering from extensive and severe dental decay that primarily attacks the root surfaces. This can lead to tooth loss over a very short period of time.

The change from a natural dentition to having to wear dentures late in life can have a number of detrimental effects. They may find it more difficult to eat and as a consequence their nutritional intake is less healthy. This will have an adverse affect in their general health.

They may become self-conscious and as a result their social interaction with others may be badly affected and their self-confidence may be reduced.

At a time in life when they have less disposable income they may suddenly have to face increasing bills for dental treatment.

### **Good dental care for the elderly is essential**

These are the reasons why it is so important that patients in their later years should continue to receive an extremely high standard of dental care and regular diagnostic examination, which must include X-ray examination. There is now good evidence that suggests older patients should receive more frequent dental checks than healthy younger adult patients.

