

synapse

- solutions for healthcare providers

Fighting the Drought:

Take a look at Dry Mouth and Xerostomia

3 Clinical CEU's

Compiled by Carin Brent

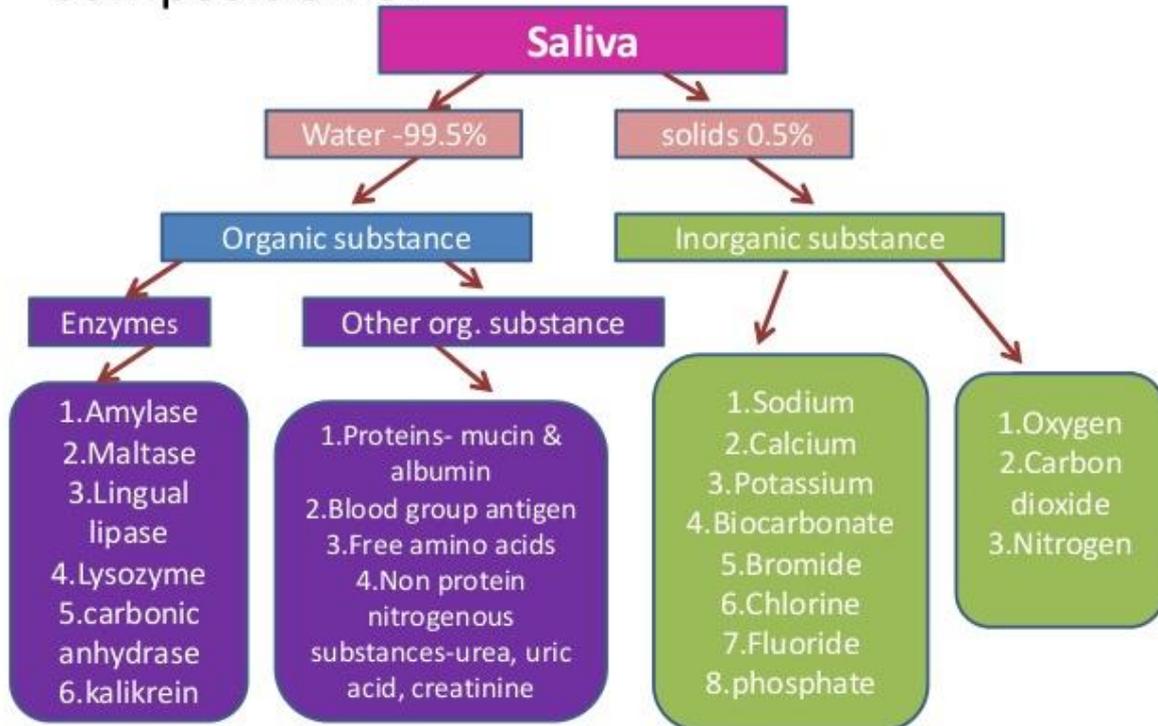
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Definition: Xerostomia, also known as dry mouth and dry mouth syndrome, is dryness in the mouth, which may be associated with a change in the composition of saliva, or reduced salivary flow, or have no identifiable cause.^[1]

Causes of xerostomia: This symptom is very common and is often seen as a side effect of many types of medication. It is more common in older people (mostly because this group tend to take several medications) and mouth breathers.

Dehydration, radiotherapy involving the salivary glands, chemotherapy and several diseases can cause hyposalivation or a change in saliva consistency- hence a complaint of xerostomia. Sometimes there is no identifiable cause, and there may be a psychological origin or cause rather than a physical one.

Composition of



16

[2]

Saliva plays an important role in maintaining the integrity of oral structures, in personal relationships, in digestion and controlling oral infection.^{[3][4]}

One of the most important functions of saliva is to remove microorganisms and dietary components from the mouth.^{[3][4]}

Saliva acts as the first defence against mechanical, chemical and infectious attacks by protecting against numerous oral bacteria and fungus.^{[3][5]}

Another key role of saliva in the oral cavity is the formation of the salivary pellicle. This is a tissue coat or blanket that covers the mucosal surfaces and teeth.^{[3][6]}

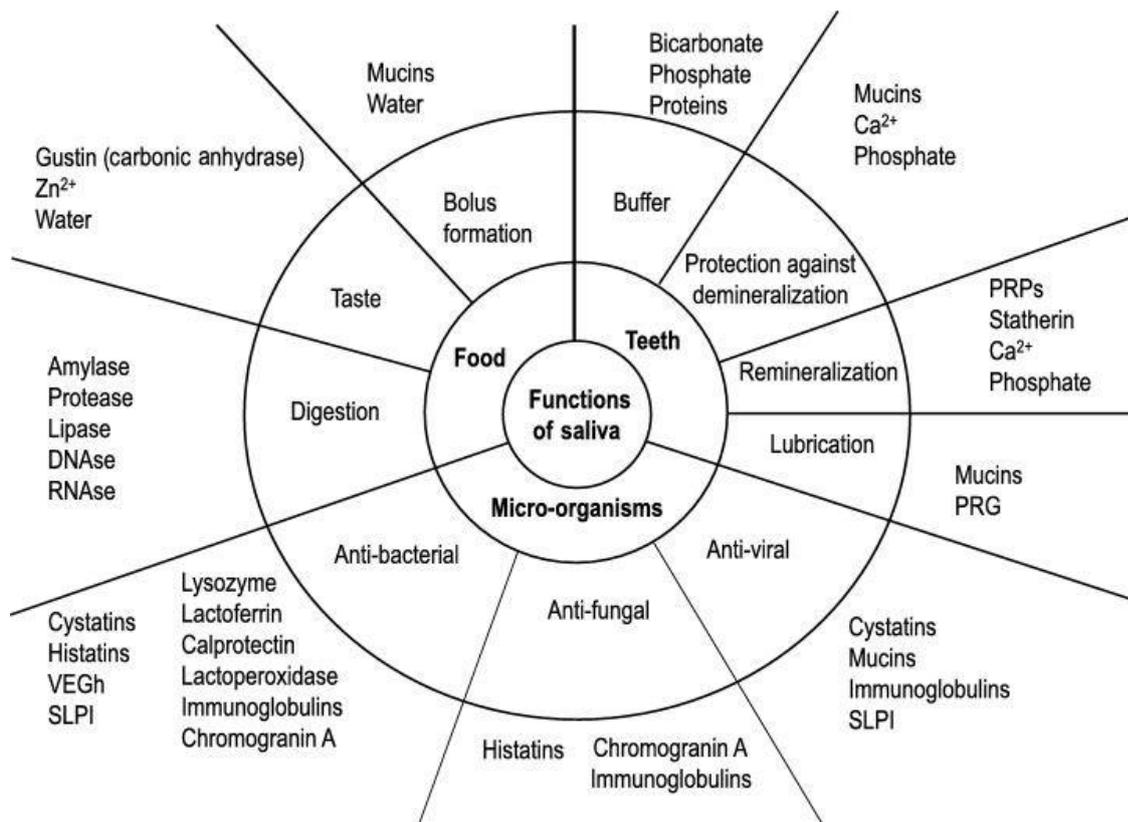
It provides a physical barrier for the underlying structures.

When saliva is reduced, the oral mucosa becomes vulnerable to physical, chemical and microbial insult. A lack of salivary pellicle can subject patients to mucosal allergies to some foods, drinks, dental hygiene products and dental materials.

When salivary pellicle is lacking it reduces tissue lubrication, subjecting the mucosa to traumatic ulcers, especially of the tongue and cheeks.

Salivary glycoproteins, particularly mucins, maintain the coating and lubrication of the oral mucosa and help to facilitate speech.

Several salivary proteins possess antimicrobial functions. Salivary enzymes such as lysozymes and lacto-peroxidase help to control oral infections and help to reduce gingival inflammation.^{[3][6][7]}



[8]

The role of saliva in protecting against caries.

- Diluting and eliminating sugars and other substances
- Buffering capacity – resulting from bicarbonate, phosphate and some protein systems
- Balancing demineralisation/remineralisation – at a pH greater than 6 saliva is supersaturated with phosphate (which forms hydroxyapatite). When pH falls below the critical level 5.5 the HA begins to dissolve, freeing phosphates that attempt to restore the pH balance
- Antimicrobial action

Dawes established a sugar clearance model based on the knowledge of unstimulated salivary flow and volume of saliva before and after swallowing food. A high volume of saliva at rest increases the speed of sugar removal, explaining the increased risk of caries in patients with a low unstimulated salivary flow rate.^{[3][4]}

It was also found that sugar clearance does not occur equally in all areas of the mouth. It is faster in the areas closest to where salivary ducts drain into the mouth as it circulates faster there than where it forms a pool. Clearance from the mucosa and the teeth also varies. On the teeth, clearance will be slower from surfaces that are more retentive and more difficult for saliva to reach.^[3]

Prevalence of Dry mouth

- A study by Nederfors et al. amongst 3,313 people aged 20-80 (in Sweden) found prevalence of xerostomia was 21.3% for men and 27% for woman ^{[3][9]} Individuals who reported taking medication had a higher prevalence of the condition (32.5% men and 28.4% women) than those not taking medication (18.8% men and 14.6% women).

Prevalence increases with age, continuation of medication and numbers of medications taken^[3]

- Another study in Rochester New York (amongst 710 American adults aged 19 to 88) observed that 24% of women and 18% of men suffered ^[3]
- Amongst a group of patients with rheumatoid arthritis Russell et al. found that 42% showed signs of dry mouth^{[3][9]}
- Xerostomia is found in 30% of patients suffering from cancer increasing in severity with advance disease.^{[3][9]}
- Overall prevalence of dry mouth increases with age and accounts for approximately 30% of the population aged 65 and older ^{[3][9]}

Causes of dry mouth

If dry mouth is persistent, there may be an underlying cause including:

- Medication – most medications associated with a dry mouth affect the sympathetic nervous system, thickening and limiting the amount of saliva. Over 400 medicines, many of them in common use, induce salivary gland hypofunction. ^{[3][5]}

This is more frequent in women and older adults. ^{[3][10]}

Oralieve® research shows, 41% of Dental Healthcare Professionals believe medication is the main factor to cause dry mouth ^[3]

- Diabetes – a common reason for people with diabetes experiencing a dry mouth, is having consistently high blood sugar levels. It is important to try to keep blood sugars within the recommended range.

An oral or dental infection may lead to increased blood glucose levels while your body tries to fight the infection ^{[3][11]}

- Radiotherapy to the head and neck – this can cause the salivary glands to become inflamed
- Sjögren's Syndrome – a chronic auto-immune disorder in which the body attacks its own moisturising-producing glands ^{[3][12]}
- A blocked nose – which may lead to mouth breathing, drying the mouth ^[3]
- Other causes of dry mouth can include dehydration, malfunctioning saliva glands and stress.

An underlying cause of dry mouth should be rectified; for example, dry mouth-producing drugs may be changed for alternatives, and causes such as diabetes should be treated. ^[3]

Patients should be educated into efforts to avoid factors that may increase dryness. ^{[3][13]}

Medications associated with dry mouth include:

Anorectic	Fenfluramine
Anxiolytics	Lorazepam, diazepam
Anticonvulsants	Gabapentin
Antidepressants – tricyclic	Amitriptyline, imipramine
Antidepressants – SSRI	Sertraline, fluoxetine
Antiemetics	Meclizine
Antihistamines	Loratadine
Antiparkinsonian	Biperidene, selegiline
Antipsychotics	Clozapine, chlorpromazine
Bronchodilators	Ipratropium, albuterol
Decongestants	Pseudoephedrine
Diuretics	Spirolactone, furosemide
Muscle relaxants	Baclofen
Narcotic analgesics	Meperidine, morphine
Sedatives	Flurazepam
Antihypertensive	Prazosin hydrochloride
Antiarthritic	Piroxicam ^[3]

Complications of head and neck cancer

Within the head and neck there are more than 30 areas where cancer can develop, including the mouth, lips, voice box, throat, salivary glands, nose and sinuses and areas at the back of the throat.^{[3][15]}

Chemotherapy is used to treat roughly 70% of cancer patients and a lot of patients unfortunately go on to develop oral health complications.^{[3][16]}

Certain chemotherapeutic agents can alter saliva buffering capacity. Drugs used to treat cancer can result in thickening of saliva inducing a dry feeling and impairing salivary function.^{[3][5]} This is often reversible after treatment.

Radiotherapy to the head and neck can cause irreversible hyposalivation. The degree of destruction of glandular tissue depends on the dose of radiation administered.^{[3][5]}

The salivary tissue is extremely sensitive to radiation and doses of greater than 30 Gy are sufficient to change salivary function permanently.^{[3][5]}

Partial recovery of the gland is possible unless the whole gland has undergone high doses of radiation.^{[3][5]}

Radiotherapy does not spare normal cells with high replication rates such as epithelium of skin and mucous membranes or highly specialised cells in neurological tissue, salivary gland secretory tissue or osteoblasts in bone which, when damaged, are unable to repair themselves.^{[3][17]}

Dry mouth is responsible for the most common and long-standing problems following orofacial radiotherapy. Salivary gland function rarely recovers following secretory cell damage and it remains difficult to avoid gland damage.^{[3][17]}

In one survey, investigators observed that 64% of long-term survivors (at least 3 years after conventional radiotherapy) had a moderate to severe degree of xerostomia.^{[3][18]}

Radiation induced damage to the salivary glands that alters the volume, consistency and pH of secreted saliva. Saliva changes from thin secretions with a neutral pH to thick, tenacious secretions with increased acidity.^{[3][18]}

With continued impacts on quality of life for patients who are potentially cured of their cancer, this poses a new health problem.

Radiation-induced dry mouth starts early during treatment: in the first week 50-60% decrease in salivary flow occurs and after 7 weeks flow diminishes to approximately 20%.^{[3][18]}

Salivary function continues to decline for up to several months following radiotherapy. Some recovery is possible 12-18 months after radiotherapy however dry mouth generally develops into a life-long condition.^{[3][18]}

A survey of 65 patients who survived for longer than six months after radiotherapy found:

- 91.8% complained of a dry mouth
- 43% had difficulty chewing
- 63.1% had dysphagia (difficulty swallowing)
- 75.4% had taste loss
- 50.8% had altered speech
- 48.5% had difficulty with dentures
- 38.5% reported increased tooth decay

Swallowing food may also become a problem post radiotherapy due to a generalised decrease in the mobility of pharyngeal structures and a delay of laryngeal closure.^{[3][18]}

Improvements in cancer treatment outcomes mean that dental practitioners will have to potentially treat and advise patients requiring oral healthcare with malignancies at various stages of the disease. Patients will also require extra care once treatment is over, as survivorship rates continue to increase.^[3]

Complications of Sjogren's syndrome

Sjögren's Syndrome is a chronic autoimmune disorder in which the body attacks its own moisture-producing glands.^{[3][12]} The disease has a strong female potency (thought to be a female to male ratio of 9:1)^{[3][5]} and is more prevalent in Caucasian women, with the mean age of onset usually between the age of 40-60.^{[3][19]}

What happens in Sjögren's Syndrome?

The immune system attacks the moisture-producing glands resulting in dry eyes and xerostomia. Primary Sjögren's occurs by itself while secondary occurs with another autoimmune disease such as rheumatoid arthritis or lupus.

The main symptoms are dry eyes, dry mouth, skin rashes, thyroid problems, joint and muscle pain, pneumonia, vaginal dryness, numbness and tingling in the extremities and fatigue.

If suspecting a patient is suffering from Sjögren's Syndrome, the dental team can look for the following signs:

- decay
- fillings that are loose
- swelling of the parotid gland.

The immune dysfunction associated with Sjögren's may affect the body's defence against the microorganisms related to periodontal disease.

If Sjögren's Syndrome is suspected after seeing a patient with dry eyes and dry mouth a specialist referral is required. Diagnosis is made from the history and clinical features, as well as possible anti-body studies or other investigations such as ultrasound.^{[3][13]}

The Dental Professional needs to be vigilant of the signs and symptoms and refer to a specialist appropriately.

An underlying cause of dry mouth should be rectified; for example, dry mouth-producing drugs may be changed for alternatives, and causes such as diabetes should be treated.

Patients should be educated into efforts to avoid factors that may increase dryness.^{[3][13]}

The impacts of Sjögren's Syndrome

People with Sjögren's have been reported to have higher numbers of cariogenic and acidophilic micro-organisms in comparison with those found in age-matched control individuals.^{[3][20]}

In otherwise healthy people with adequate salivary output, bacteria are dislodged and expelled from tooth surfaces by the mechanical process of chewing, tongue movement and salivary flow. However conditions which lead to dry mouth such as Sjögren's Syndrome can interrupt this process.

One study found that participants with Sjögren's Syndrome with excellent oral hygiene who received routine 3 to 4 month recall dental treatment and used fluoride toothpaste still had elevated levels of dental caries along with premature tooth loss.^[3]

Impact of dry mouth

Living with a dry mouth can be extremely uncomfortable and make everyday events such as eating and speaking difficult. Dry mouth exposes your oral health to a number of threats. For older patients it can impact their ability to socialise and ultimately their nutritional intake.

Take a look at some of the examples below;

Physical impacts of dry mouth

- Changes in speech patterns
- Dry soft tissues allow dentures to rub and can lead to soreness
- Dry mouth can contribute to dental caries as saliva plays an important role in buffering acids
- Change dietary preferences – who would want to eat peanut butter or crackers with a dry mouth?
- Changes in appearance – dry mouth can mean lipstick on the teeth or dryness of lips
- There is an increased susceptibility to oral candidiasis.^{[3][10]} It also causes increased accumulation of bacterial plaque resulting in gingival inflammation, periodontal disease and halitosis.^{[3][10]}

Subjective symptoms of dry mouth^{[3][4]}

Things patients may mention:

- 'Dry mouth' feeling or xerostomia
- Frequent thirst – increased intake of liquid
- Difficulty in swallowing
- Difficulty in speaking
- Difficulty in eating dry foods because they stick to the roof of the mouth
- The need to drink water frequently
- Difficulty in wearing dentures
- Pain and irritation of the mucosa
- A burning feeling in the tongue
- A distorted sense of taste (disgeusia)
- Tongue sticking to the roof of the mouth – particularly at night
- Needing to put a glass of water on the bed stand to drink at night (and resulting in nocturia)
- Sensitivity to spicy foods
- Lack of or diminished taste perception
- Altered salty and metallic taste
- Malodour
- Development of hoarseness
- Coughing episodes
- Painful salivary glands

Potential impacts of dry mouth on nutrition

Xerostomia has been shown to be a contributing factor to the high prevalence of geriatric malnutrition in the United States.^{[3][9]}

Oral problems that frequently affect older people such as missing teeth, dry mouth and mastication limitations were found to be correlated with reductions in quality of life after controlling for other influences such as general health, income and marital status.^{[3][21]} Poor oral health status is one of the most frequent causes of malnutrition due to its effect on mastication and swallowing which can lead to severe deficiencies in energy and nutrient intake.^{[3][21]}

A study by Sheiham et al. reported that patients with dry mouth were significantly more likely to avoid crunchy foods like vegetables, dry foods like bread and sticky foods such as peanut butter. They also found associations with statistical significance between xerostomia and food avoidance.^{[3][5]}

What to look for in patient examinations^{[3][4][22]}

- Loss of glossiness of the oral mucosa
- Dryness of the mucosa which becomes thin and cracked
- Fissures in the dorsum of the tongue
- Angular cheilitis
- Thick saliva
- Increased frequency of oral infection especially by candida
- Presence of caries in atypical locations – cervical margins, incisal margins or tips of teeth^{[3][4]}
- Increased size of major salivary glands

Advice for patients with dry mouth

Early diagnosis and treatment is necessary to effectively manage dry mouth, prevent progression and promote comfort and oral function.^{[3][7]}

Patients with dry mouth should be counselled to avoid anything that can contribute to oral dryness or irritation.^{[3][21]}

- Alcohol has a drying effect and should be avoided in both beverages and in oral products such as mouthwashes
- Caffeine acts as a mild diuretic which promotes fluid loss and may worsen dry mouth
- The dry air of modern homes contributes to the sensation of dryness – use of a humidifier, especially at night, may help
- Consumption of carbohydrate-containing foods and drinks between meals should be minimised – especially sticky foods and also acidic foods
- Avoid irritating toothpastes,^{[3][23]} such as those containing SLS and strong flavours

The American Dental Association recommends:

Other ways you might find relief include the following:

- chewing sugar-free gum or sucking on sugar-free hard candies to stimulate salivary flow;
- sucking on ice chips;
- sipping water with meals to aid in chewing and swallowing food;
- using alcohol-free mouth rinse;
- avoiding carbonated drinks (like soda), caffeine, tobacco, and alcohol;
- using a lanolin-based lip balm to soothe cracked or dry lips^[24]

Helping Patients with a dry mouth

Diagnosis requires a thorough medical history with a particular focus on^[3]

- Reported symptoms
- Medication use
- Past medical history^[3]

Questions to ask:

1. Does your mouth feels dry?
2. Do you have difficulty in eating dry foods?
3. Do you get up at night to drink water?
4. Does your mouth feel dry when eating a meal?
5. Do you sip liquids to aid in swallowing food?
6. Do you suck sweets or cough lozenges to relieve dry mouth?
7. Do you have difficulty swallowing certain foods?
8. Does the skin on your face feel dry?
9. Does your eyes feel dry?
10. Does your lips feel dry?
11. Does the inside of your nose feel dry?

Osailan et al. developed a list of several helpful clinical signs when diagnosing dry mouth:^{[3][23]}

1. Sticking of an intraoral mirror to the buccal mucosa or tongue
2. Frothy saliva
3. No saliva pooling in the floor of the mouth
4. Loss of papillae of the tongue dorsum
5. Altered/smooth gingival architecture

6. Glassy appearance to the oral mucosa (especially the palate)
7. Lobulated/deeply fissured tongue
8. Cervical caries (more than two teeth)
9. Mucosal debris on palate (except under dentures)

Properties of saliva in patients with dry mouth

The saliva of patients with dry mouth becomes more viscous and foamy, losing its lubricating ability and adhering to teeth and mucous membranes. This thick saliva causes food and bacteria to adhere to the teeth, resulting in a build-up of plaque, which may ultimately contribute to periodontal disease.^{[3][5]}

9 Steps for managing a dry mouth^{[3][13]}

- Correct dehydration. Drink enough water, and sip on water and other non-sugary fluids throughout the day. Rinse with water after meals.
- Replace missing saliva. Encourage patients to replace what their saliva has lost. This can be achieved with OTC or prescription products.
- Stimulate saliva production. Recommend saliva stimulants such as sugar-free chewing gum with xylitol or diabetic sweets.
- Avoid consuming dry foods. Sip water or non-alcoholic drinks with meals to soften food. Avoid dry, hard or crunchy foods. Eat more foods with a high liquid content.
- Avoid hot, dry environments. Consider a humidifier for the bedroom^[3]

Protect against dental caries

- ✓ Avoid sugary foods and drinks
- ✓ Avoid sticky foods
- ✓ Keep your mouth very clean (brushing and flossing twice daily)
- ✓ Use a fluoride toothpaste
- ✓ Have regular dental checks
- ✓ Keep dentures out at night^[3]

Protect the lips by applying a lip moisturiser^[3]

Protect against candida infection, periodontal disease and halitosis

- ✓ Keep your mouth very clean
- ✓ Keep your mouth as moist as possible
- ✓ Brush or scrape the tongue
- ✓ Keep dentures out at night
- ✓ Use antifungals if recommended by a specialist

Avoid anything that can make a dry mouth worse such as:

- ✓ Medication unless it is essential
- ✓ Alcohol (including mouthwashes)
- ✓ Smoking
- ✓ Caffeine
- ✓ Mouth breathing

Ask your suppliers about products that can help alleviate the symptoms of dry mouth.

Question time:

Keep in mind that where there is more than one correct answer, you need to mark all the correct answers to get the point.

1. What role does the saliva play?
 - a. Aids swallowing
 - b. Freshens breath
 - c. Physical barrier for underlying structures
 - d. Cleans teeth

2. What is the critical pH at which enamel starts to dissolve?
 - a. 5.0
 - b. 5.5
 - c. 6.0
 - d. 6.5

3. how does saliva prevent tooth decay?
 - a. Keep teeth moist
 - b. Remove micro-organisms and dietary components
 - c. Helps to demineralise the teeth
 - d. Help restore the pH of the mouth

4. What is the name of the auto-immune disorder in which the immune system attacks the body's moisture-producing glands?
 - a. Lupis
 - b. Hashimoto Thyroiditis
 - c. Sjögren's Syndrome
 - d. Saliva Syndrome

5. A blocked nose can result in dry mouth.
 - a. True
 - b. False
6. Which of the following are causes for dry mouth? Tick all that apply
 - a. Diabetes
 - b. Excessive exercise
 - c. Medication
 - d. Smoking

7. After radiation, how long does it take for the saliva glands to recover? Tick all that apply
 - a. 4-6 weeks
 - b. 6-12 months
 - c. 12-18 months

d. In some cases it never recovers

8. Which of the following could irritate a dry mouth? Tick all that apply.

- a. Fluoride
- b. Strong flavours
- c. Xylitol
- d. Sodium Lauryl Sulfate (SLS)
- e. Alcohol

9. Dry mouth has been shown to be a contributing factor to which of the following...

- a. Malnutrition
- b. Diabetes
- c. High blood pressure
- d. Coeliac disease

10. What type of foods should patients with a dry mouth avoid? Tick all that apply.

- a. Sticky foods
- b. Foods with a sauce
- c. Acidic foods
- d. Liquid foods (soups)
- e. Mildly flavoured foods

11. Clinical features of a patient suffering from dry mouth include: Tick all that apply

- a. No saliva pooling in the floor of the mouth
- b. Loss of papillae of the tongue dorsum
- c. Altered/smooth gingival architecture
- d. Glassy appearance to the oral mucosa (especially the palate)

12. Patients suffering from dry mouth are at increased risk of getting

- a. caries
- b. periodontitis
- c. diabetes

13. A patient suffering from dry mouth should get the following instructions:

- a. suck on ice
- b. avoid drinks with xylitol in.
- c. wear lanolin based lip balm

14. Chewing xylitol chewing gum is advised.

- a. True
- b. False

15. Angular cheilitis may be a sign of dry mouth.

- a. True
- b. False

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