
XEROSTOMIA, ETIOLOGY, DENTAL IMPLICATIONS AND PROSTHODONTIC MANAGEMENT

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Abstract: Saliva is one of the most complex but versatile and important body fluids and contains a number of systems which serve a wide spectrum of physiological needs. It is composed of 98% water. The rest 2% is composed of mucus, glycoproteins, enzymes, antibacterial and bacterial compounds such as secretory IgA and lysozyme. Saliva is essential for the preservation of oropharyngeal health, and it serves many functions in the oral and gastrointestinal environment. Saliva aids in swallowing, oral cleansing, speech, digestion and taste. Xerostomia is defined as dry mouth resulting from reduced or absent salivary flow. Xerostomia causes problems with mastication, phonetics, deglutition and wearing dentures. There are extreme discomforts in wearing dentures with Xerostomia. Absence of saliva in the interface of denture and mucosa not only causes denture sores due to lack of lubrication it also decreases the denture retention. Xerostomia possess a major threat in denture wearing patients because it might result in sores in mouth and causes failure in retention of denture. Hence the clinicians must be aware of this condition to prevent Xerostomia in denture patients. Dentists should be able to diagnose this condition and administer appropriate treatment to provide acceptable level of comfort and function of denture wearers. The aim of this review article is to establish facts about xerostomia, etiology and dental implication and prosthodontic management in denture wearers.

Keywords: xerostomia, saliva, prosthodontic management

1. INTRODUCTION

Saliva is a body fluid, secreted by three pairs of major salivary glands (parotid, submandibular and sublingual) and by many of minor salivary glands. [1] Saliva plays a key role in maintaining oral health and function. [2] The lubricant function protects the soft tissues from desiccation, penetration or ulceration. It also facilitates the swallowing of food and acts as an immunological barrier by stimulating soft-tissue repair by reducing clotting time and accelerating wound contraction. Saliva is important as a digestive initiator and an ionic stimulator for taste. [3] Saliva functions to cleanse and moisten the oral cavity. It regulates water balance, and has antimicrobial and buffering actions. [4]

Xerostomia is defined as dryness of the mouth due to the lack of normal secretion of saliva. It is a common clinical condition that could be a result of systemic conditions such as rheumatic arthritis, Sjogren's syndrome, salivary gland diseases, diabetes mellitus. [4]

Adequate quantity and quality of saliva plays a significant role in promoting health of the soft and hard tissues in the oral cavity, as well as the individual's general health of [1]. Saliva is necessary for the integrity of the oral tissues and is critical for protection and maintaining of oral and systemic health [2-5].

2. ETIOLOGY OF XEROSTOMIA

Xerostomia is a symptom which is more commonly seen in ageing populations, but it is not caused by ageing. Though salivary functions remain intact in healthy older people yet a plethora of systemic diseases, medications, and head and neck radiotherapy causes Xerostomia in elderly patients. [13] The older the patients the more likely they are to have some form of disease or to be taking medications which might be having xerostomic potential because of their anticholinergic properties. The most common groups are antidepressants, antihistamines, antiparkinsonian drugs, diuretics, anti-psychotics, antihypertensives, anticholinergics and antineoplastic agents. As stated by Mason and Glenn [14] salivary secretion is regulated by autonomic nervous system and is subjected to reflex stimulation from physical and psychic causes, then Xerostomia may result from the following causes as summarized in the Table 1.

Table 1. Etiology of xerostomia

A. Factors affecting the salivary center	1. Emotions like fear, excitement, stress
	2. Organic diseases like brain tumour and Parkinson's disease
	3. Drugs like Levodopa and Morphine
B. Factors affecting the autonomic outflow pathway	1. Encephalitis
	2. Stroke
	3. Neurosurgical operations
C. Factors affecting the salivary gland functions	1. Sjogren's syndrome
	2. Obstruction and infection of salivary ducts
	3. Tumours
	4. Irradiation
	5. Excision of salivary glands
D. Factors affecting the fluid and electrolyte balance	1. Vomiting
	2. Diarrhoea
	3. Sweating or haemorrhage
	4. Polyuria of diabetes

3. SIGNS AND SYMPTOMS

Patients suffering from xerostomia exhibit not only dry mouth but also difficulty in speaking and swallowing and increased susceptibility to dental caries and oral infections. [4]

Hypo salivation is a clinical diagnosis which expresses the following symptoms: [6-8]

- Dental caries may involve tooth surfaces that are normally spared which is normally seen in patients who have had radiotherapy involving the major salivary glands
- Mouth soreness and oral mucositis
- Food may stick to the teeth
- A urge to drink water during eating
- Dry, sore, cracked lips and angles of mouth
- Thirst
- Difficulty in wearing dentures, especially while swallowing or speaking and there may be generalized mucosal soreness and ulceration of the areas covered by the denture
- Saliva will be thick and stringy
- Bad breath and foul smelling mouth
- Difficulty in chewing and swallowing food
- Gum irritation and other periodontal health issues
- Mucosa that appears dry
- Saliva that appears thick or ropey

Xerostomia can lead to dysgeusia, glossodynia, sialadenitis, cracking and fissuring of the oral mucosa, and halitosis. Oral dryness can affect denture retention, mastication, and swallowing. [5] Individuals with xerostomia also complain of problems with eating, speaking, swallowing, and wearing dentures. [9] Some people also complain of salivary gland enlargement or changes in taste. Lack of saliva may predispose one to oral infections, such as candidacies, and increase the risk of dental caries, because patients are at risk for dental caries, they should be referred to a dentist for preventive care. [3]

A study by John Wiley and sons reveals that denture wearers are more suspected to dry mouth which leads to oral infection. [10] Xerostomia can be diagnosed by various tests like measurement of the unstimulated saliva, stimulated saliva, level of salivary secretion of endocrine gland and the palatal salivary glands. [4] Denture wearers with dry mouth are more prone to fungal infections by opportunistic fungi like *Candida albicans*. It can also lead to mouth ulcer, bleeding gums, gingivitis, periodontitis and tooth decay especially around the gum line. The most common side effect of dry mouth is bad breath along with sore throat. It might rarely lead to diabetics ketoacidosis, burning mouth syndrome, taste disorders and dehydration. Majority of xerostomic participants with different sets of complete dentures were dissatisfied with oral infection. Most of the studies suggest that there is significant relation with dry mouth age, female gender and smoking status. Dental adhesive noticeably improved retention and stabilization of dentures but is also necessary for the treatment of the cause and symptoms of xerostomia. It has been stated that excess of zinc from denture adhesives leads to bone marrow suppression. [11]

4. DENTAL IMPLICATIONS

Patients with xerostomia experience various oral symptoms that are as follows:

- Increased susceptibility to periodontal disease. Xerostomia decreases the oral pH and increases the development of plaque and dental caries. Caries is a frequently occurring dental problem in such patients and this process is accelerated owing to reduction of salivary flow and inability to clear the food from oral cavity particularly sugary and acidic foods. [5] The developments of rampant caries particularly at cervical area have been observed within few weeks after radiation therapy to head neck. [10]
- Reduced denture retention and generalized denture intolerance. Decreased salivary lubrication makes denture use unpleasant and painful and chronic denture movement results in irritation and ulceration of already compromised mucosa. [9]
- Decreased buffering capacity in the oral cavity with increased risk of opportunistic infections. Reduction of saliva predisposes the patient to an over growth of the fungus *C. albicans*. [11] This may be augmented by use of denture, by smoking or by presence of diabetes. [12]
- Increased oral sensitivity, soft tissue erythema, burning mouth and intolerance to wearing of denture.
- Demineralization of tooth tissue, rapidly progressive dental caries and dental attrition. [6]

In complete denture wearers, the wetting mechanics of saliva are necessary to assist the retention of prostheses. [3] It has been reported that complete denture patients with xerostomia have more intense sore spots than patients with normal salivary flow.

The oral mucosa becomes dry and tends to crack and ulcerate, which makes wearing removable prostheses uncomfortable. Problems associated with removable dental prostheses include frequent ulcerations, poor retention, difficulty in speaking and swallowing, and frequent infections. However, other studies have shown that low salivary flow rates were not closely related to reduced masticatory performance or retention and stability in elderly complete denture wearers.

5. MANAGEMENT OF XEROSTOMIA

Management should include identification of the underlying cause. Substances and habits that potentiate oral dryness, such as smoking, alcohol, and caffeine should be avoided. When xerogenic drugs are implicated, alternative medication, dose reduction, or drug withdrawal should be considered. Another option is to alternate pharmaceutical regimens: nocturnal xerostomia can be minimized by taking the xerogenic drug during the day time when salivary production is optimal. [9]

Caries prevention

A low sugar diet and daily use topical fluoride, placement of sealants and antimicrobial mouth rinses are critical to prevent dental caries. [15] Patients should be instructed to drink plenty of fluids especially while eating dry and rough foods, but should avoid sugar containing juices and soft drinks. Topical fluorides may be useful when there is increased incidence of coronal caries, root caries or both and may be helpful in prevention of caries as well as reversal of decalcification. Supplements containing sodium fluoride, acidulated phosphate fluoride or sodium monofluorophosphate are available for professional application and for home use. These products are available in form of gels and rinses. Use of fluoride containing varnishes that provide prolonged fluoride exposure have also been advocated. In case of active caries, caries should be controlled and lesions should be properly restored.

Saliva stimulation and substitution

For patients with remaining viable salivary gland tissue, salivary stimulation may be helpful. Sugar free chewing gum, candies and mints can be used for stimulation of saliva. Pilocarpine hydrochloride and Cevimeline hydrochloride are commonly used drugs for salivary stimulation and produce clinically significant increase in salivary flow in xerostomic patients. [16] These drugs are contraindicated in patients with uncontrolled asthma, narrow angle glaucoma or iritis. Varieties of salivary substitutes are available and are effective in decreasing oral dryness. They are useful for patients in whom saliva cannot be stimulated.

Treatment of oral candidiasis

Oral candidiasis is a frequent complication in xerostomic patients and is treated with topical antifungal agents in the form of oral rinses, ointments and troches. Systemic antifungal therapy is indicated in cases of active infection or in immunocompromised patients.

6. PROSTHODONTIC MANAGEMENT OF XEROSTOMIA PATIENTS

Fixed prosthesis

In the dry oral environment, fixed non tissue bearing prosthesis are preferred where indicated. Fixed partial dentures should have full coverage retainers and easily cleaned pontics and connectors. The margins of retainers should be supragingival.

Removable partial denture

In case of partially edentulous patients using removable prosthesis special attention should be given to residual teeth and periodontal tissues. The use of gingivally approaching clasps should be avoided as it tends to catch on the cheeks. Whenever possible tooth supported denture with minimal tissue coverage should be used. Metal denture bases are preferred due to their better wettability.

Complete denture treatment

When considering complete denture treatment for xerostomic patient, close attention should be given to clinical and laboratory procedures aimed at optimizing denture retention and stability. Dentures incorporating metal bases may exhibit improved accuracy of fit and effective wetting contributing to better retention. [17,18] Metal based prosthesis are also easier to clean and have less plaque accumulation. Soft denture liners may be used to improve comfort. Denture adhesives can be used to augment retention in xerostomic patients. In addition to improved retention and stability, use of a well hydrated denture adhesive provides cushioning and lubricating effect. [19] Denture patients are more prone to *Candida albicans* infections. Therefore frequent recalls are necessary and if infection is present systemic antifungal treatment is required. Dentures supporting tissues can be treated locally with antifungal agents by coating the tissue surface of the denture prior to placement. The use of dental implants to support both fixed and removable prosthesis is a now a routine treatment option for restoration of edentulous and partially edentulous patients. Patients wearing implant supported dentures report improved oral comfort and function when compared with conventional, mucosa-supported prosthesis.

Regular review

Patients with xerostomia should be made to understand the importance of regular recall visits every three months to prevent uncontrolled caries and denture patients should be reviewed at regular intervals to prevent candida infections and problems associated with denture wear in xerostomic patients.

7. CONCLUSION

Xerostomia is a common problem encountered in older adults and if not recognized and treated can have significant effect on patient's quality of life. Dental practitioner should be able to diagnose dry mouth disorder in their elderly patients and provide preventive and definitive treatment to achieve acceptable levels of comfort and function.

Saliva is an oral fluid that plays a multitude of functions in preserving the integrity of oral tissues and in maintaining overall health of the oral cavity. Xerostomia or dry mouth may have many deleterious effects on the oro-pharyngeal health of the patient. Therefore the clinician should be able to diagnose the condition. There is no single treatment modality suitable for treating this condition but a combination of them should be able to provide a preventive and interventional treatment to reduce its impact on the patient's quality of life.

Significant association of the perception of dry mouth among denture wearers with oral symptoms and function. Xerostomia is significantly associated with increased age and smoking. Xerostomia adversely affects oral functions and overall satisfaction with dentures. Dry mouth (Xerostomia) may lead to loose dentures, irritations, sores and possible infection for denture wearers. Clinician needs to identify the possible cause for the xerostomia condition and provide the patient with appropriate treatment.

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