Xerostomia (Dry Mouth) as a Challenge in Management of the Medically Complex Patient

a report by
Abdel Rahim Mohammad, DDS, MS, MPH, FAAOM

Professor and Director, Geriatric Dentistry and Community Outreach Programs, The Ohio State University, College of Dentistry

Introduction

Xerostomia (dry mouth) is defined as a subjective complaint of dry mouth that may result from a decrease in the production of saliva. It affects 17–29% of sample populations based on self-reports or measurements of salivary flow rates. It is more prevalent in women and can cause significant morbidity and a reduction in a patient's perception of their quality of life. The daily salivary output is estimated to be approximately one liter/day and the flow rate can fluctuate by as much as 50% with diurnal rhythms. Xerostomia affects approximately one-third of patients undergoing radioiodine treatment. There is a higher incidence among elderly patients taking medications. Saliva keeps the teeth, oral tissues, and throat healthy by providing lubrication, buffering effect, and minerals, such as calcium, fluoride, and phosphorus. It also helps in cleaning the mouth of food debris and in swallowing and digesting food. Lack of saliva will make the mouth more prone to a burning feeling, disease, and fungal infection (see *Table 1*).

Etiology

Etiological factors of xerostomia include multiple medications. Over 1,000 prescribed medications have been reported to cause xerostomia (see *Table 2*). In the geriatric population, drug-induced xerostomia has been reported to contribute to difficulty with chewing and swallowing. This may lead to avoidance of eating certain foods. Other factors associated with xerostomia include head and neck radiotherapy, Sjögren's syndrome or autonomic nerve dysfunction (see *Figure 1*).

Sjögren's syndrome can be caused by ionizing radiation and can injure the major and minor salivary glands. This may lead to atrophy of the secretory components and results in varying degrees of temporary or permanent xerostomia. Toxic substances in chemotherapeutics agents can also cause Sjögren's syndrome. Diabetes mellitus patients with poor glycemic control are more likely to complain of xerostomia and may have decreased salivary flow. Xerostomia has been reported in 45–60% of patients who developed chronic graft-vs-host disease after undergoing allogenic bone marrow transplantation. The loss of saliva and a number of immunological abnormalities have also been implicated as possible complications of silicone breast implants.[5,7] Other conditions that can cause dry mouth include anxiety or depression, HIV and AIDS, primary biliary cirrhosis, bone marrow transplantation, vasculitis, chronic active hepatitis, renal dialysis, and stress.

It has been estimated that a 50% reduction in salivary secretion needs to occur before the xerostomia becomes apparent. An affirmative response to at least one of the five following questions about symptoms has been shown to correlate with a decrease in salivary flow:

- Does your mouth usually feel dry?
- Does your mouth feel dry when eating a meal?
- Do you have difficulty swallowing dry food?
- Do you use liquids to aid in swallowing dry food?
- Is the amount of saliva in your mouth too little most of the time or do you not notice it?

Warning Signs of Xerostomia

The warning signs of xerostomia are dry, burning mouth and throat, and dry cracking lips, especially in the corners. The cracks may be tender and/or bleed. The elderly person may have problems with wearing dentures and have problems eating and swallowing food. They may have difficulty with speech due to mouth soreness and increased caries and periodontal disease.

Clinical Appearance

The clinical appearance of xerostomia include dry, pale, or atrophic oral mucosa. The tongue may be devoid of papillae and have a fissured and inflamed appearance. New and recurrent dental caries, and difficulty with chewing, swallowing, and tasting may also occur.[4] Fungal infections are common.

Management

The management of drug-induced dysfunction includes consultation with a physician to decrease

Abdel Rahim Mohammad, DDS, MS, MPH, FAAOM is a Professor of Geriatric Dentistry and Oral Medicine and Director of the Community Outreach and Engagement Office at The Ohio State University College of Dentistry, Columbus, Ohio. He currently directs the geriatric dentistry program at The Ohio State University College of Dentistry. This program has received the American Dental Association recognition award for contribution to the advancement of the art and science of geriatric oral health. He also serves as a consultant expert in geriatric dentistry on Netwellness.com and is a vice president of the Oral Health Section of the Gerontological Society of America. He was recently elected as a secretary of the Gerontology and Geriatric Dental Education Section of the American Dental Education Association. He is the author of *Geriatric Dentistry*, 4th edition, for dental students and oral health professionals. In addition, he has published over 100 papers, monographs and books. Dr Mohammad earned an MSc from the University of California, San Francisco, Master of Public Health from The University of Texas, Houston, and an Academic Fellowship in Oral Medicine from the American Academy of Oral Medicine. He acquired formal training in geriatric dentistry at the University of Texas, San Antonio, and was a mid-career fellow in geriatric dentistry at the University of California, Los Angeles.

Figure 1: Oral Dryness in the Elderly

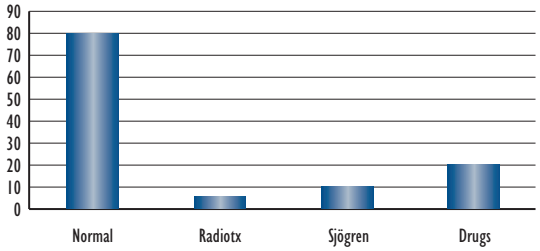


Table 1: Antimicrobial Factors in Human Whole Saliva

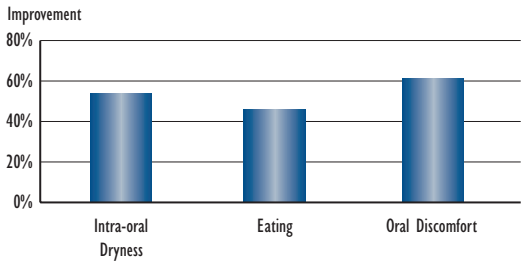
Non-immunoglobulin Factors	***Origin***
Lysozyme	*Salivary glands, crevicular fluid (PMNs)*
Lactoferrin	*Salivary glands, crevicular fluid (PMNs)*
Salivary peroxidase	*Salivary glands*
SCN	*Salivary glands, crevicular fluid*
H_20_2	*Salivary glands, crevicular fluid (PMNs)*
Myeloperoxidase Cl	*Crevicular fluid (PMNs)*
	Salivary glands, crevicular fluid
Agglutinins, aggregating proteins	*Salivary glands*
Histidine-rich polypeptides	*Salivary glands*
Proline-rich proteins	*Salivary glands*
Immunoglobulin Factors	
Secretory IgA	*Salivary glands*
IgA, IgG, IgM	*Crevicular fluid*

PMN= polymorphonuclear leukocyte, SCN= subepidermal calcified nodule, H_20_2= hydrogen peroxide, Ig= immunoglobulin

Table 2: Medications That Can Cause Xerostomia

Analgesics	*Anti-inflammatories*
Anorexiants	*Anti-psychotic*
Anti-acne drugs	*Bronchodilators*
Anticholinergics	*Decongestants*
Anticonvulsants	*Diuretics*
Antidepressants	*Muscle relaxants*
Antihistamines	*Sedatives*

Figure 2: Effects of Biotene, Oral Balance Gel, Mouthwash, Toothpaste and Chewing Gum on Post-irradiation Xerostomia



drug dose, alteration of drug dosages, or substituting one xerostomic medication for a similar-acting drug with fewer salivary side effects. Salivary substitutes include sodium carboxymethyl cellulose 0.5% aqueous solution to be dispensed as 8 fl oz.

Salivary Substitutes

Commercial salivary substitutes, such as over-the-counter (OTC) moisturizing gels, include: Oral Balance, XERO-Lube and Salivart, Moi-Stir, Orex and Optimoist (see *Table 2*). Many elderly patients express satisfaction with moisturizing gels, particularly Oral Balance, a product manufactured by Laclede, Inc. This product contains some constituents normally present in saliva, such as glucose oxidase, lactoperoxidase, lysozyme, and lactoferrin. These constituents are effective antimicrobial agents, which some patients lack due to mouth dryness. Oral moisturizers are available in different forms, including moisturizing toothpaste, gum, mouthwash, and a topical gel. These moisturizers may include ingredients such as the enzymes lactoperoxidase, lysozyme, glucose oxidase and lactoferrin, which compensate for the loss of the antibacterial components in the saliva. In a study conducted on 28 patients with post-irradiation xerostomia, these patients were given a two month supply of Biotène mouthwash, toothpaste, chewing gum, and Oral Balance gel. The improvement results in each category are listed in *Figure 2*.

Symptomatic Treatment

Symptomatic treatment includes sipping water frequently throughout the day, letting ice melt in the mouth, restricting caffeine intake, avoiding mouth rinses containing alcohol, humidifying the sleeping area, and coating lips with lubricant.

Salivary Stimulants

Salivary stimulants include sugarless candies, mints, chewing gums, and prescription medications, such as pilocarpine hydrochloride (Salagen), cevimeline capsules (Evoxac) and bethanecol tablets (Urecholine).

Pilocarpine medication may need 2–3 months to determine effectiveness. Side effects include sweating and diarrhea. It should be avoided in patients with narrow-angle glaucoma, severe asthma, and pulmonary disease.

Oral Hygiene

The xerostomia patient should maintain good oral hygiene by flossing daily. They should brush at least twice a day using toothpaste with fluoride and alcohol-free (e.g. Biotène) toothpaste. ■

A longer version of this article containing references can be found in the Reference Section on the website supporting this briefing (www.touchbriefings.com).