



Subject: Clinical management of cancer therapy-induced salivary gland hypofunction and xerostomia

The American Academy of Oral Medicine (AAOM) affirms that a thorough medical history and clinical oral examination provide the basis for the appropriate diagnosis and clinical management of salivary gland hypofunction and xerostomia induced by cancer therapy. The goal of therapy is to maximize salivary flow rate, to prevent or minimize the adverse effects of salivary gland hypofunction, and to improve patient masticatory function and comfort.

This Clinical Practice Statement was developed as an educational tool based on expert consensus of the AAOM leadership. Readers are encouraged to consider the recommendations in the context of their specific clinical situation and consult, when appropriate, other sources of clinical, scientific, or regulatory information before making a treatment decision.

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PURPOSE

The AAOM affirms that a thorough medical history and clinical oral examination provide the basis for the appropriate diagnosis and clinical management of salivary gland hypofunction and xerostomia induced by cancer therapy. The goal of therapy is to maximize salivary flow rate, to prevent or minimize the adverse effects of salivary gland hypofunction, and to improve patient masticatory function and comfort.

METHODS

This statement is based on a review of the current dental and medical literature, systematic reviews, and evidence-based clinical management guidelines related to the clinical management of salivary gland hypofunction and xerostomia induced by cancer therapy. A MEDLINE search was conducted using the search terms “xerostomia,” “saliva,” “radiotherapy,” and “antineo-

plastic agents.” Additional articles and books were found by hand search of reference lists. Expert opinion regarding best clinical practice was utilized when systematically derived clinical evidence was not available. Detailed information on levels of evidence can be found in the literature referenced for each statement.

BACKGROUND

Salivary gland hypofunction (objectively decreased saliva flow rate) may result in xerostomia (subjective feeling of dry mouth) and impair speaking, tasting, chewing, and swallowing and may alter or compromise nutrition. Furthermore, salivary gland hypofunction increases the risk of dental caries, dental erosion, oral candidiasis, bacterial infection (sialadenitis, gingivitis), taste disturbances, mucosal sensitivity, and mucosal trauma. Ultimately, xerostomia can severely diminish the patient’s well-being and quality of life.

Salivary gland hypofunction and xerostomia can be induced by cancer therapies, including radiation therapy (i.e., radiation therapy for head and neck cancer, total body irradiation in hematopoietic stem cell transplantation, and radioactive iodine in thyroid cancer), cancer chemotherapy, allogeneic hematopoietic stem cell transplantation, and surgical trauma to salivary gland tissue.¹

- 1. Radiation therapy.** Xerostomia is the most common late adverse effect observed in patients who have undergone radiation therapy to treat head and neck cancer. Reduced salivary secretion may be noted within the first week of radiation therapy, and depending on the total radiation dose delivered, the saliva flow rate may be dramatically reduced by the end of radiation treatment. A further reduction and thickening of residual saliva secretion may be experienced for up to 3 months after radiation therapy. Saliva secretion from spared salivary gland tissue (total radiation dose <26 Gy for parotid glands and <39 Gy for submandibular glands) can potentially recover over time (e.g., up to 2 years after radiation treatment).^{1,2}
- 2. Chemotherapy.** Salivary gland hypofunction and xerostomia induced by cancer chemotherapy are usually temporary and typically resolve within 6 months to 1 year after the cessation of treatment.¹

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3. Allogeneic hematopoietic stem cell transplantation. Graft-versus-host disease occurs when antibodies against the host are produced by transplanted allograft hematopoietic stem cells. Subsequent targeting of host salivary gland tissue may result in salivary gland hypofunction and xerostomia.³

The diagnosis of cancer therapy–induced salivary gland hypofunction and xerostomia is accomplished by correlating a thorough medical history (see Clinical Practice Statement on Medical History)⁴ with the onset of the signs and symptoms of oral dryness. The presence of comorbidities and use of xerogenic medications (e.g., antiemetics, opioids, antidepressants, antihypertensives, diuretics) may exacerbate cancer therapy–induced salivary gland hypofunction and xerostomia.

A clinical oral examination, including manual palpation of the major salivary glands and assessment of gland swelling, visual inspection of saliva expressed from individual major salivary glands after gland massage from back to front, and sialometry (measurement of unstimulated and stimulated whole saliva flow rate) should be accomplished in all patients.⁵

Clinical management of salivary gland hypofunction and xerostomia induced by cancer therapy is symptomatic and intended to improve residual secretory activity, masticatory function, and patient comfort. Strategies to improve salivary flow rate include functional stimulation (e.g., chewing and taste) and pharmacologic stimulation. Measures prescribed to augment inadequate salivary flow rate include sipping water, application of neutral bland rinses, and saliva substitutes.⁶⁻¹⁰

POLICY STATEMENT

1. The AAOM recognizes that the diagnostic evaluation of patients with salivary gland hypofunction and xerostomia induced by cancer therapy includes:

- A. A thorough medical history with attention to onset and signs and symptoms of oral dryness.
- B. The AAOM encourages dental health care providers to obtain sialometry on all patients before and/or after cancer treatment.
- C. A clinical oral examination, including manual palpation of the major salivary glands and assessment of gland swelling, visual inspection of saliva expressed from individual major salivary glands through gland massage from back to front, and sialometry (unstimulated and stimulated whole saliva flow rate, mL/min).⁵
- D. Other special examinations as indicated (e.g., blood tests, radiographs, scintigraphy, sialography, ultrasonography, nuclear magnetic resonance, computed tomography, sialoendoscopy,

eye tests, biopsy) to investigate other potential diagnoses.¹¹

2. The AAOM recognizes the challenges associated with the clinical management of salivary gland hypofunction and xerostomia and makes the following recommendations:

- A. Ongoing monitoring should be accomplished to evaluate disease progression and/or effect of clinical management initiatives.
- B. Stimulation of residual salivary activity by chewing and taste (e.g., sugar-free chewing gum, lozenges, or mints) may be effective.⁶
- C. Pharmacologic stimulation of residual salivary activity by pilocarpine or cevimeline may be effective. However, these medications can cause significant adverse effects and are not currently approved in all countries for treatment of xerostomia.⁶
- D. Sipping water or the use of saliva substitutes (mouthwash, spray, or gel) may provide further moisturization of the oral cavity and alleviation of xerostomia.⁶
- E. Bland rinses such as 0.9% saline or sodium bicarbonate solution (1 teaspoon salt and 1 teaspoon baking soda in 1 L of water) can provide hydration of the oral cavity,¹² alleviate xerostomia, and neutralize oral pH.
- F. Acidic products should be avoided for stimulation of saliva secretion in dentate patients unless specially prepared for alleviating xerostomia.
- G. Patients should be carefully instructed on how to benefit from the appropriate use of water, bland rinses, and saliva substitutes. Saliva substitutes should be used for 1 to 2 weeks before evaluating treatment efficacy.
- H. Acupuncture or mild electrostimulation of the salivary glands are novel treatments that may alleviate xerostomia in some patients.⁸

3. The AAOM recognizes that several oral health problems can develop when salivary gland hypofunction persists for more than a few months. These include dental caries, dental erosion, oral candidiasis, and bacterial infection. Accordingly, salivary gland hypofunction should be addressed by a dental health care professional by instituting timely preventive measures such as meticulous oral hygiene, intensive fluoride regimens and remineralizing solutions, frequent dental checkups, and nutritional counseling.^{3,12,13}

4. The AAOM recognizes that current management of salivary gland hypofunction and xerostomia induced by cancer therapies is palliative with short-term relief. More innovative research on salivary gland repair, regeneration, and damage prevention is

required to improve quality of life of cancer survivors.²

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REFERENCES

1. Jensen SB, Pedersen AML, Vissink A, et al. A systematic review of salivary gland hypofunction and xerostomia induced by cancer therapies: prevalence, severity and impact on quality of life. *Support Care Cancer*. 2010;18:1039-1060.
2. Vissink A, Mitchell JB, Baum BJ, et al. Clinical management of salivary gland hypofunction and xerostomia in head and neck cancer patients: successes and barriers. *Int J Radiat Oncol Biol Phys*. 2010;78:983-991.
3. Elad S, Raber-Durlacher JE, Brennan MT, et al. Basic oral care for hematology—oncology patients and hematopoietic stem cell transplantation recipients: a position paper from the joint task force of the Multinational Association of Supportive Care in cancer/International Society of Oral Oncology (MASCC/ISOO) and the European Society for Blood and Marrow Transplantation (EBMT). *Support Care Cancer*. 2015;23:223-236.
4. AAOM Clinical Practice Statement: Medical History. *Oral Surg Oral Med Oral Pathol Oral Radiol*. 2016;121:618-619.
5. Sreebny LM, Vissink A. Sialometry: The measure of things, with ease and reliability. In: Sreebny LM, Vissink A, eds. *Dry Mouth—the Malevolent Symptom: A Clinical Guide*. 1st ed. Ames, IA: Wiley-Blackwell; 2010:64-76.
6. Jensen SB, Pedersen AML, Vissink A, et al. A systematic review of salivary gland hypofunction and xerostomia induced by cancer therapies: management strategies and economic impact. *Support Care Cancer*. 2010;18:1061-1079.
7. Furness S, Worthington HV, Bryan G, Birchenough S, McMillan R. Interventions for the management of dry mouth: Topical therapies. *Cochrane Database Syst Rev*. 2011;7:CD008934.
8. Furness S, Bryan G, McMillan R, Worthington HV. Interventions for the management of dry mouth: non-pharmacological interventions. *Cochrane Database Syst Rev*. 2013;8:CD009603.
9. Lovelace TL, Fox NF, Sood AJ, Nguyen SA, Day TA. Management of radiotherapy-induced salivary hypofunction and consequent xerostomia in patients with oral or head and neck cancer: meta-analysis and literature review. *Oral Surg Oral Med Oral Pathol Oral Radiol*. 2014;117:595-607.
10. Hanchanale S, Adkinson L, Daniel S, Fleming M, Oxberry SG. Systematic literature review: xerostomia in advanced cancer patients. *Support Care Cancer*. 2015;23:881-888.
11. Vissink A. Other ways to assess salivary gland disease. In: Sreebny LM, Vissink A, eds. *Dry Mouth—the Malevolent Symptom: A Clinical Guide*. 1st ed. Ames, IA: Wiley-Blackwell; 2010:77-88.
12. McGuire DB, Fulton JS, Park J, et al. Systematic review of basic oral care for the management of oral mucositis in cancer patients. *Support Care Cancer*. 2013;21:3165-3177.
13. Hong CH, Napenas JJ, Hodgson BD, et al. A systematic review of dental disease in patients undergoing cancer therapy. *Support Care Cancer*. 2010;18:1007-1021.