

# An update on xerostomia: part II

In the final of a two-part series, **Brenda Baker** and **David Reaney** discuss the management of xerostomia

## Management of hyposalivation and xerostomia (Guggenheimer and Moore, 2003)

The general philosophy when looking after patients with hyposalivation and xerostomia is focused on treatment to relieve symptoms and prevent oral complications. Treatment planning to reduce the severity of dry mouth symptoms should be customised for each patient.

A multidisciplinary model of care for xerostomia and salivary gland hypofunction should include the following considerations.

### Patient education

- The patient should receive complete information about the possible causes of dry mouth and the possible results of impaired salivary secretion, which can include dental caries, candidiasis and mucosal complications
- Counselling for coping strategies and advice regarding behavioural and lifestyle factors linked to the condition that can be modified

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- Patients with hyposalivation commonly need more frequent maintenance visits (usually three to six months) (Vissink et al, 2007)
- A patient-centric regime should highlight preventive measures including daily oral hygiene, regular dental visits, use of topical fluoride, daily alcohol-free mouthrinse. Alcohol can desiccate the oral mucosa and aggravate xerostomic symptoms
- The application of 2.26% fluoride varnish at least biannually is advised for at-risk patients of all ages. Use of medicaments in customised bleaching trays allows prolonged use of remineralising agents
- Seek advice regarding cessation of tobacco including pharmacotherapies (Gorin and Heck, 2004)
- Toothpastes and gels containing 1.1% neutral sodium fluoride are well tolerated with patients with increased dental hypersensitivity (Bartold, 2006). Use of sodium lauryl sulphate (SLS) free toothpastes. For example, Biotene is recommended. The absence of SLS increases the permeability of the oral mucosa.
- Changing the medication regime may be appropriate to increase salivary flow (Sreebny and Schwartz, 1997) – for example, changing from a diuretic drug to an Angiotension Converting Enzyme (ACE) inhibitor may be valuable
- The treating physician may reduce the dose of the offending drug dosage or change the time at which the medication is given. Thus, a xerostomic drug may be taken in the morning. This has the effect of avoiding the increased xerostomic effect due to the circadian rhythm of reduced saliva flow reduction at night as opposed to during the day.

### Conservative management

- Maintain adequate hydration – eight to 10 glasses of water daily. This should include use of a water-filled spray bottle during the day especially when exercising (Stubbs, 2012)
- Use a humidifier at night
- At home, patients can keep ice chips in the mouth for moisture (Scully, 2003)
- Use salivary flow stimulants – sugarless chewing gum, sugarless hard candies
- Limit caffeine intake.

### Saliva substitutes/oral lubricants

- These are non-prescription agents and are available as solutions, dentrifices, sprays or gels. Formulations have multiple contents including carboxymethyl or hydroxymethylcellulose, electrolytes and flavouring
- Most salivary substitutes provide relief for a limited amount of time
- Most useful when used just before meals, bedtime or speaking.

### Pharmacological treatment with salivary stimulants

- Drugs are cholinergic in action
- These drugs can alter cardiac conduction and their use should be avoided in patients ▶

**Figure 1: Condition before treatment – amalgam filling in tooth UL6**



- with significant heart disease
- These agents should be used cautiously in patients using beta-blockers
- These are parasympathetic stimulating agents that are unsuitable for patients who have uncontrolled asthma, narrow-angle glaucoma and acute iritis
- Visual impairment has been noted when taking doses of 30mg three times a day especially in situations of reduced lighting
- The drugs most often employed are Cevimeline and Pilocarpine and are approved by US Food and Drug Administration to treat dry mouth due primarily to Sjogren's Syndrome or radiation therapy. The side effects for both these medications include sweating, nausea and rhinitis
- Pilocarpine is a parasympathetic drug that increases secretion of the salivary glands. Pilocarpine 5mg/three times per day before meals and before bed is advised for patients who have some saliva-producing capacity. However, this medication should not be used in patients with acute glaucoma, cardiovascular or respiratory disorders such as asthma.

**Acupuncture**

- This may be suitable for patients for whom conventional medical interventions are unsuccessful and, therefore, fail to provide enough relief
- Patients receive a subjective benefit from acupuncture (O'Sullivan and Higginson, 2010)
- MRI evidence suggests that neurological responses are elicited by acupuncture (Deng et al, 2008).

**PATIENTS WITH COMPLETE DENTURES WHO EXPERIENCE XEROSTOMIA ARE MORE LIKELY TO DEVELOP OTHER COMPLICATIONS**

**Full denture wearers**

- Patients with complete dentures who experience xerostomia are more likely to develop other complications, including pain from denture irritation and loss of retention (Malladi et al, 2012)
- The greater risk of developing candidiasis in edentulous patients may contribute to their discomfort. Soft denture liners or incorporation of metal in the palate of the maxillary denture have been shown to be beneficial treatment options for some patients.

**Radiotherapeutic interventions (Vissink et al, 2012)**

- Intensity modulated radiation therapy (IMRT) allows radiation treatment beams of non-uniform intensity to be delivered to the central bulk of disease while sparing normal surrounding tissue
- Radiation therapy can be directed at the lesion site in the head and neck region while sparing the surrounding salivary glands. The parotid gland is the gland most often spared with IMRT

- Studies have shown about 80% of patient who had received IMRT no longer experienced debilitating xerostomia (Nutting et al, 2011; Eisbruch et al, 2010).

**Electrostimulation (Lafaurie et al, 2009)**

An intraoral device for electrostimulation of salivary glands has been developed to treat dry mouth.

The Saliwell Gennarino (Saliwell) is a removable intraoral appliance similar to a nightguard, combining microelectronics, software and wireless communication. This system can be used by any patient with xerostomia.

An impression is taken of the lower jaw and a horseshoe shaped plastic appliance is constructed over the lower dentition. It is designed so that it is easy to insert and remove by the patient.

There are three components (Figure 1):

1. A miniaturised electronic stimulator that has a signal generator power source and conduction circuitry. The electrodes are located on the third molar area mucosa to permit stimulation of the lingual nerve
2. An intraoral removable appliance
3. A handheld remote infrared remote control is used to turn the device on and off (Lafaurie et al, 2009).

The distance between the surfaces of the electrodes and the lingual nerve can vary between 1-5mm. In addition to the lingual nerve, the long buccal nerve runs next to Gennarino's electrodes.

As a result of exciting these nerves, all salivary glands are stimulated by the salivary reflex. Those nerves of the salivary reflex arch that are excited by the stimulating Gennarino are:

1. Taste buds of the anterior 2/3 of the tongue → lingual nerve → facial nerve → salivary center, from which efferent fibres can follow three pathways:
  - a) → facial nerve → lingual nerve → submandibular and sublingual glands
  - b) → glossopharyngeal nerve → maxillary nerve → parotid gland
  - c) → nerves to all minor salivary glands
2. Mucosal sensorial receptors (tactile perception)
  - lingual and long buccal nerves
  - trigeminal nerve → salivary center
  - efferent nerves to salivary glands.

Intraoral delivery of low-current electrostimulation has the potential to relieve symptoms of xerostomia by increasing oral wetness.

Natural saliva secretion is increased by neuroelectrostimulation. The device works by sending electrical pulses of very low intensity (which is not discerned by the patient) to stimulate the nerves related to the secretion of the salivary glands, causing them to generate more natural saliva. Thus, the salivary glands are electrostimulating their associated nerves – mainly the lingual nerve – the application of stimulating signals on the lingual nerve lead to enhanced salivary secretion. Neurostimulation of salivary glands takes the still remaining salivation reserves into therapeutic use.

Some points to note with the use of the Gennarino:

1. Before taking impressions, the clinician should check that the dental, periodontal and oral mucosal status is ideal
2. In head and neck irradiated patients, the electrodes should be placed in the side that is opposite to the irradiated site
3. Irradiated patients and patients who take bisphosphonates must avoid developing irritation-originated lesions. If mucosal ulceration occurs, the lesion has to heal before the device can be worn
4. This appliance may be able to replace drug therapy. More serious cases may also need sialagogues, particularly patients with dry eye
5. Its use in pregnant patients is not recommended. The use with other extra-oral electro-stimulation devices (eg, pacemaker) seems to be safe
6. Optimal levels of fluoride in toothpastes and mouthwashes should be maintained at the same time the appliance is used
7. A new Gennarino needs to be fabricated annually with fresh batteries. However, based on the frequency and intensity of use, the power source may run out of power earlier
8. Double-blind placebo-controlled clinical trials have demonstrated a significant increase in saliva secretion and relief to the patients
9. The manufacturers affix a note to the back cover of the shipment box that the device must be used within 13 months of the manufacturing date
10. Patients should not sleep with the device in place and activated
11. When travelling by plane, the device is safe to use except during takeoff, landing and during unstable weather
12. The device is not to be used when participating in sports
13. The device is unsuitable for use at the same time as chewing gum
14. The manufacturer advises that frequency of use is 'as needed' but not more than 10

minutes every hour. Some users report reaching the desired effect using it for one minute three to four times a day. Other patients need up to five minutes

15. Gennarino should be protected from direct sun, bright light and heat as exposure to light shortens the lifetime of the power source
16. The patient should be reviewed periodically by the dentist who fitted the appliance.

### Final thoughts

The dentist plays an important role in the management of xerostomia and salivary gland hypofunction. In conjunction with the patient's medical team, the dentist will be the primary health care professional responsible for the maintenance of oral health and the management of symptoms and reduction in the undesirable consequences of inadequate salivary flow.

The essential basis is proper diagnosis of the problem, determination of possible treatments available, and supportive and adjunctive therapies. The prevention and treatment of xerostomia should be a coordinated effort between the radiation oncologist and the dental surgeon. ■

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### AUTHOR NOTE

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