XEROSTOMIA MANAGEMENT

Part II of a two-part series on xerostomia.


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Management of hyposalivation and xerostomia

(Guggenheimer J, Moore PA., 2003)

The general philosophy when looking after patients with hyposalivation and xerostomia is focused at 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 which can be modified.
- Patients with hyposalivation commonly need more frequent maintenance visits (usually 3-6 months) (Vissink A, 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 dessicate the oral mucosa and aggravate xerostomic symptoms.
- The application of 2.26% fluoride varnish at least bi-annually is advised for at-risk patients of all ages. Use of medicaments in customized bleaching trays allows prolonged use of remineralising agents.
- Seek advice regarding cessation of tobacco including pharmacotherapies (Gorin SS, Heck JE., 2004).
- Toothpastes and gels containing 1.1% neutral sodium fluoride are well tolerated with patients with increased dental hypersensitivity (Bartold PM, 2006). Use of sodium lauryl suphate (SLS) – free toothpastes eg. Biotene is recommended. The absence of SLS increases the permeability of the oral mucosa.

Collaborative professional input

- The systemic conditions and medications used should be discussed with the treating physician, oncologist or other health care provider.
- Patients with dry mouth, dry eyes and salivary gland enlargement should be checked for Sjogren's Syndrome (SS) as there is a 16-fold more chance of experiencing lymphoma compared with the general population (Kassan SS, Moustsopoulos HM, 2004). Prompt diagnosis allows for recognition of comorbid diseases and permits active management of both the ophthalmic and intraoral complications.
- Dentists must be aware of prescription and over-the-counter medications associated with dry mouth to discuss modifications or consult with the physician whether other medication alternatives are viable.
- Changing the medication regime may be appropriate to increase salivary flow (Sreebny LM, Schwartz SS, 1997) – eg. 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 reduces saliva flow reduction at night as opposed to during the day.

Conservative management

- Maintain adequate hydration 8–10 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 C, 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 hydroxymethycellulose, 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 with significant heart disease.
- These agents should be used cautiously in patients using beta-blockers.
- These are parasympathetic stimulating agents which 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/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 Sjoegren's Syndrome or radiation therapy. The side effects for both these medications includes sweating, nausea and rhinitis.

- Pilocarpine is a parasympathetic drug which 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 patient with acute glaucoma, cardiovascular or respiratory disorders – eg. 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 EM. Higginson IJ. 2010).
- MRI evidence suggests that neurological responses are elicited by acupuncture (Deng G. et al., 2008).

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 AS. 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 A, 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 whilst sparing normal surrounding tissue.
- Radiation therapy can be directed at the lesion site in the head and neck region whilst 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 CM. et al 2011, Eisbruch A. et al., 2010).

Electrostimulation

(Laufarie G. et al., 2009)

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

The Saliwell GenNarino® (Saliwell Ltd., Harutzim, Israel. www.saliwell.com) is a removable intraoral appliance similar to a nightguard, combining microelectronics, software and wirelesss communication. This system can be used by any patient with xerostomia.

The author acknowledges Saliwell GenNarino® scientific resources for the references within this article: http://saliwell.com/articles/

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 3 components (Fig. 1):

1. A miniaturized 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. (http://www.medicinaoral.com/medoralfree01/v14i2/medoralv14i2p76.pdf)

The distance between the surfaces of the electrodes and the lingual nerve can vary between 1–5 mm. In addition to the lingual nerve, also 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 fibers can follow 3 pathways:

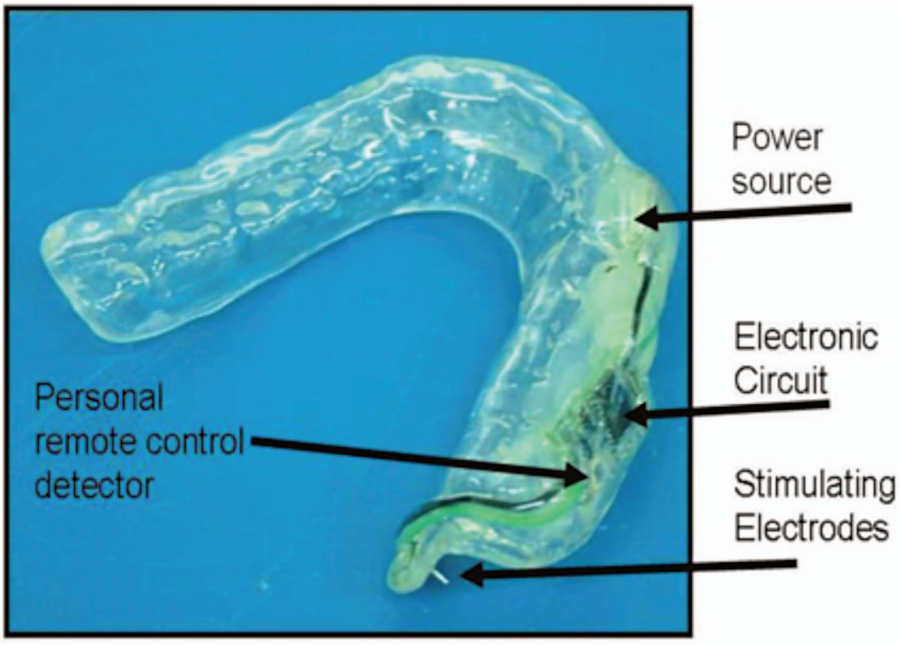
a) → facial nerve → lingual nerve → submandibular and sublingual glands.
b) → glossopharyngeal nerve → maxillary nerve → parotid gland.
c) → nerves to all minor salivary glands.

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 neuro-electro-stimulation. 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.

Fig. 1



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 (e.g. 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.
   Double blind placebo controlled clinical trials have demonstrated a significant increase in saliva secretion and relief to the patients.
8. 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.
9. Patients should not sleep with the device in place and activated.
10. When travelling by plane, the device is safe to use except during takeoff, landing and during unstable weather.
11. The device is not to be used when participating in sports.
12. The device is unsuitable for use at the same time as chewing gum.
13. 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 3-4 times a day. Other patients need up to 5 minutes.
14. GenNarino® should be protected from direct sun, bright light and heat as exposure to light shortens the lifetime of the power source.
15. The patient should be reviewed periodically by the dentist who fitted the appliance.

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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