Prosthodontic management of patients with xerostomia

Katherine Chiu-Man Leung *, BDS, MDS, FRACDS, FCDSHK (Prosthodontics), FHKAM (Dental Surgery)

ABSTRACT  Xerostomia is the subjective sensation of oral dryness, usually, but not invariably, associated with hyposalivation. The major dental problems reported by xerostomic patients include a high caries rate, repeated failure of dental restorations, and early tooth loss that necessitate various degrees of prosthodontic treatment. This article outlines the prosthodontic management of this special group of patients.

Introduction

Xerostomia is a subjective complaint, often referred to as reduced salivary flow. Data regarding the prevalence of xerostomia in the Hong Kong population are unavailable, nonetheless epidemiological surveys from other countries reveal a widely varying incidence of 10% to 80% 1, 2. Reduced salivary flow is common in the elderly, and is associated with a variety of factors: therapeutic head and neck irradiation, Sjogren’s syndrome, HIV, diabetes, renal failure, and pharmacotherapy. Oral manifestations of hyposalivation typically include glossitis, mucositis, angular cheilosis, dysgeusia, difficulty in chewing and swallowing, and an increased incidence of caries. Repeated failure of dental restorations due to recurrent caries, an increased prevalence of tooth wear, early tooth loss, and poor tolerance of dentures are some of the major dental problems reported by such patients. Prosthodontic therapy for this unique patient group is challenging due to the limited choice of abutments, loss of vertical dimension, and poor occlusion.

Management of xerostomia

Successful prosthodontic treatment depends on the first instance on control of the xerostomia.

Prevention of further xerostomia and alternate pharmaceuticals

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.

Caries prevention

Dietary analysis can identify ‘hidden dietary sugar’ with subsequent advice given on how to modify dietary habits. Oral hygiene in isolation does not prevent dental decay: a caries control program should be implemented 3 (Table 1).

Saliva stimulation and substitution

Pilocarpine hydrochloride and cevimeline hydrochloride are common saliva stimulants (Table 2). Clinical trials reveal that both agents produce a clinically significant and consistent increase in salivary flow in xerostomic patients 4, 5.

Table 1  Caries control program

<table>
<thead>
<tr>
<th>Mechanical plaque control</th>
<th>Use of disclosing agent and disposable mouth mirror in addition to routine toothbrushing aids</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use of fluoride</td>
<td>• Daily fluoride mouthwash (0.05%) + in-office fluoride varnish application (22 mg sodium fluoride/mL) every 3 months, or</td>
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<td></td>
<td>• Daily self-applied 1% neutral sodium fluoride gel delivered via custom trays for at least 5 minutes (severe xerostomias)</td>
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<tr>
<td>Use of chlorhexidine</td>
<td>• 10% Chlorhexidine gel in gel trays + fluoride varnish in 2 consecutive days every 3 months, or</td>
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<td></td>
<td>• 10% Chlorhexidine varnish applied once weekly for 4 consecutive weeks and then a single re-application every 6 months</td>
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Saliva substitutes are useful in the presence of inadequate salivary gland function. Dentures, if worn, can be modified to include a reservoir to prolong its action, although they are not very effective and are often reported to be too bulky and interfere with speech. A recently developed intraoral lubricating device shows promising results: preliminary clinical trials demonstrate improved oral comfort.

Prosthodontic management

Treatment of existing disease

Oral candidiasis can be treated with antifungal agents, together with measures that maintain a high standard of oral/denture hygiene. The adjunctive use of chlorhexidine is also recommended. Active caries should be controlled and the lesions properly restored. The choice of restorative should take into account the xerostomic oral environment and fluoride compliance. Glass-ionomer cements offer superior property of fluoride release, but in acidic and xerostomic conditions they are susceptible to desiccation and acid erosion with loss of marginal integrity soon after placement. Similarly, the possibility of marginal gap formation and recurrent caries render composite resin restoratives ineffective. Amalgam with glass-ionomer linings is suitable provided patients have good fluoride compliance.

Choice of dental prosthetics

No replacement

The need for tooth replacement should be verified and the benefits of various treatment options weighed against those of no treatment. Shortened dental arches may be appropriate for patients in whom there is some posterior tooth loss but relatively periodontally healthy remaining teeth.

Fixed prostheses

In a dry oral environment, optimal reconstruction is with a non–tissue-bearing prosthesis. A fixed prosthesis is suitable provided oral hygiene and fluoride compliance are good. Bridges should preferably have full-coverage retainers, and easily cleaned pontics and connectors. The margins of retainers should be supragingival and metal. Gold alloy is the occlusal material of choice.

Removable prostheses

Removable partial dentures

Reduced salivary lubrication makes denture use unpleasant and painful. Chronic denture movement results in irritation and ulceration of the already compromised mucosa. Dentures can nonetheless be provided if they can be entirely tooth-supported with minimal tissue coverage. It is prudent to avoid the use of gingivally approaching clasps that tend to catch on the cheeks. Denture components should be made to free the gingival margins. Metal-base material is preferable due to its superior wettability.

A combination approach of fixed and removable prostheses to rehabilitate partially edentulous patients is advantageous to xerostomic patients. This allows the removable partial denture design to be simplified and tissue coverage minimized.

Complete dentures

Complete dentures can be very damaging to the dry mouth. Nevertheless, there is no evidence that patients with xerostomia are more dissatisfied with complete dentures than patients with normal salivary flow. Retention can be improved by soaking the denture in water and spraying its entire surface with saliva substitute. Good stability can be achieved by a well-constructed baseplate and carefully arranged artificial teeth.

Dental implants

Implant placement in conjunction with fixed prostheses are clearly beneficial although their use in this special group of patients must be extremely cautious. Relatively

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**Table 2** Common saliva stimulants

<table>
<thead>
<tr>
<th>Type</th>
<th>Pharmacological action</th>
<th>Dosage</th>
<th>Indications</th>
<th>Contra-indications</th>
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<tr>
<td>Muscarinic cholinergic agonist</td>
<td>Parasympathomimetic agent acting at muscarinic receptors</td>
<td>5 mg 4 times a day, oral</td>
<td>Uncontrolled asthma, acute iritis, or narrow-angle glaucoma</td>
<td>Gastro-intestinal disorder, sweating, tachycardia, bradycardia, increased pulmonary secretions, increased smooth muscle tone, and visual disturbances</td>
</tr>
<tr>
<td>Muscarinic agonist binding to the muscarinic M3 receptors</td>
<td>30 mg 3 times a day, oral</td>
<td>Sjogren's syndrome</td>
<td>Same as pilocarpine, with significant history of cardiovascular and pulmonary diseases</td>
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* Salagen (MGI Pharma Inc., Bloomington, United States)
† Evoxac (Daichi Pharmaceutical Corporation, Montvale, United States)
short-term clinical reports\textsuperscript{9,10} have described the successful application of osseo-integrated implants with greatly improved patient comfort. Nonetheless multicenter clinical trials on the use of implants in medically compromised patients are lacking.

**Review and maintenance**

Review and maintenance of any treatment is integral to its success. Patients with xerostomia must appreciate the importance of regular review to prevent uncontrolled caries development. Severe caries can occur as early as 3 months after irradiation\textsuperscript{11}, thus 3-monthly review is prudent in the first instance but may be later prolonged depending on response to treatment.

**Conclusion**

Xerostomic patients form a unique group of patients in whom prosthodontic treatment is challenging. Successful treatment depends on knowledge and recognition of their particular problems and methods of prevention combined with skillful prosthodontics.

**References**