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## Evaluation of Topical Therapies in the Treatment of Hyposalivation.

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### ABSTRACT

Although being a frequent condition in the oral cavity, still no adequate therapeutic possibilities for the treatment of hyposalivation exist. The aim of this review article was to summarize knowledge already published on the Pubmed evaluating the topical therapeutic possibilities with regard to the hyposalivation. The results of this review have shown that every topical treatment applied in patients with dry mouth alleviates symptoms of hyposalivation. However, it is still inconclusive which topical treatment is the best option for patients dry mouth symptoms.

**Keywords:** topical, hyposalivation, oral cavity, dry mouth

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**INTRODUCTION**

Hyposalivation is the objective finding of decreased salivary flow rate unlike xerostomia which is subjective feeling of dry mouth. Hyposalivation can be caused by various conditions/diseases. Certain inherited diseases of the salivary glands such as triple A syndrome might result in dry mouth. Acquired diseases of the salivary glands such as obstructive ones (sialolithiasis, tumors) as well as microbial ones (actinomycosis, tuberculosis, cat-scratch disease, toxoplasmosis, HIV and hepatitis) might result in dry mouth. Systemic diseases of the salivary glands such as Sjogren's syndrome, sarcoidosis, depression and anxiety as well as kidney and heart failure might also lead to the dry mouth. Most frequently side effect of drug intake is the cause of dry mouth. More than 500 drugs are implicated in the hyposalivation. Unfortunately the drugs most frequently used are antihypertensives and psychotropic drugs and are the ones causing dry mouth. The diagnosis of hyposalivation can be obtained by relatively simple sialometry test which shows amount of salivary secretion through the period of five minutes while the examinee sits in the chair. Stimulated salivary flow can be obtained by use of the sour beverages (citric acid) or paraffin gum in the same manner. Additionally, other diagnostic procedures are available and might be helpful when in doubt such as x-ray, ultrasound with fine needle aspiration, sialography, scintigraphy, magnetic resonance, computerized tomography and sometimes even biopsy of the minor salivary glands (lower lip) or major salivary glands [1]. Literature data offer a great deal of either local or systemic salivary stimulants/substitutes, however these are still in many sufferers inadequate. Current therapies rely on saliva substitutes and pharmacological stimulation of the parasympathetic system. These treatment modalities are somewhat limited by their short-term efficacy, high cost and drug interactions or other adverse effects [2]. Various substitutes with different ingredients are available for topical and symptomatic therapy, but there are no generally accepted treatment suggestions due to the lack of studies proving effective relief of symptoms. Levine et al [3]. concluded that an ideal artificial saliva should be "long-lasting", provide lubrication, inhibit colonization of microflora responsible for dental caries and gingivitis, and coat the oral soft tissues for protection against environmental insult and desiccation.

**MATERIALS AND METHODS**

We have performed Pubmed search from the year 1994 to 2014 in order to find out used topical treatment options for hyposalivation.

**RESULTS**

**Table 1: List of authors and used topical therapies for dry mouth.**

<b>AUTHORS</b>	<b>TOPICAL THERAPIES</b>
Alpoz et al.	Mineral dental water spray.
Alpoz et al.	Xialine
Sweeney et al.	Mucin containing/mucin free spray
Mouly et al.	Oxygenated glycerol triester spray
Shirodaria et al.	OASIS Mouth Moisturizing Spray
Hofauer et al.	LipoSaliva
Lopez Jornet et al.	Toothpaste and mouthwash (triclosan, fluoride, gingival revitalizers, mineral salts).
Femiano et al.	Artificial saliva and citric acid
Shahdad et al.	Bioxtra/Biotène Oralbalance
Johansson et al.	Salinum (linseed mucilage)
Andersson et al.	Salinum (linseed mucilage)
Khursudian	Oral lozenge of interferon-alpha

In the Table 1. Data regarding the authors and tested topical dry mouth therapies are listed.

**DISCUSSION**

In the existing literature, there are studies regarding topical treatment of dry mouth based on the studies investigating either comparison between salivary substitutes and placebo or comparison between the two different salivary substitutes.

Alpöz et al. [4] concluded that the commercial mineral water dental spray was not more efficient than placebo in the management of dry mouth-related symptoms. On the contrary, the results of our study (still unpublished data) show that mineral spray was superior to the commercial artificial saliva and marshmallow root. Another study by Alpoz et al. [5] showed that Xialine was more preferred by patients suffering from Sjögren's syndrome in comparison to the placebo. Sweeney et al. [6] concluded that there was no evidence for increased benefit of a mucin-containing spray over a mucin-free placebo among 35 xerostomic hospice patients. However, it was clear that both sprays provided worthwhile symptomatic relief of oral dryness for many of the participants. Mouly et al. [7] reported that new oxygenated glycerol triester oral spray taken five times daily was superior to Saliveze in improving xerostomia and oral tissue condition in 41 older institutionalised patients. Shirodaria et al. [8] documented that OASIS Mouth Moisturizing Spray helped provide dry mouth relief in 24 participants in comparison to the Saliveze. Hofauer et al. [9] concluded that liposomal local therapy (LipoSaliva®) caused a significant reduction of xerostomia in patients with primary sicca syndrome, however, there was no control group. López-Jornet et al. [10] concluded that the use of a toothpaste and mouthwash based on triclosan, fluoride, gingival revitalizers and mineral salts, improves the quality of life of 30 patients suffering xerostomia in comparison to the placebo. Femiano et al. [11] reported that both artificial saliva and citric acid provided immediate relief from oral dryness in 54 patients with xerostomia. Citric acid also provided a longer-lasting feeling of oral moistness at 1 hour after use owing to its protracted activity on salivary gland function. Shahdad et al. [12] concluded that both treatments (Bioxtra and Biotène Oralbalance) were effective in alleviating the symptoms of 20 post-radiotherapy xerostomic patients, although Bioxtra achieved superiority in some of the outcomes assessed compared with Biotene. Johansson et al. [13] concluded that positive effects on symptoms in patients with Sjögren's syndrome were seen after use of Salinum without or with chlorhexidine. Andersson et al. [14] reported that the linseed mucilage significantly reduced the symptoms of dry mouth in 20 patients with xerostomia, who had been treated for cancer in the head and neck by radiation in comparison to the sodium carboxymethyl cellulose preparation. This effect increased with increasing time of saliva substitute use. The linseed mucilage Salinum appeared to be a suitable saliva replacement in mouth dry patients. Johansson et al. [15] reported that in the majority of the patients out of 37 tested, the use of Salinum (water soluble extract of linseed) reduced the symptoms of hyposalivation and generally the patients with the most severe symptoms experienced the greatest relief of the symptoms when they used Salinum. Furthermore, Furness et al. [16] reported that there is no strong evidence that any topical therapy is effective for relieving the symptom of dry mouth. Oxygenated glycerol triester spray is more effective than an aqueous electrolyte spray whereas there is no evidence that gum is better or worse than saliva substitutes. Khurshudian [17] reported that oral lozenges of 150 IU interferon-alpha 3 times a day for the 8 patients with primary Sjögren's syndrome improved saliva production, relieved symptoms of xerostomia and xerophthalmia, and was well tolerated by the patients in comparison to the four patients treated with placebo.

It seems that in patients with dry mouth topical application of solutions/gels/sprays/toothpastes alleviates dry mouth symptoms no matter what their constituents are. However, we can not conclude which of these agents are the most effective ones and further studies are needed.

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