



Artificial salivas

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Quick reference/description

Mucosa is hydrated by the continuous flow of watery saliva over the mucosa and by the adhesion of mucins. This helps in keeping the mucosa moist and lubricated.

Artificial salivas mimic the viscous nature of saliva but lack the other physical properties of saliva [1, 2]. To supplement any pre-existing saliva, artificial salivas should be complementary to any pre-existing saliva when used with dry mouth patients. Saliva has a lower surface tension than water which is created by the presence of surface active proteins. The low surface tension aids in spreading a thin film over the mucosa [3], but the low surface tension in artificial salivas, due to the presence of certain chemicals, overwhelms the natural surface tension of saliva which speeds evaporation.

Indications

Xerostomia or dry mouth, swallowing problems, taste disturbances or ulcerated mucosa.

Materials/instruments

Whole mouth saliva collectors, dry mouth visual analogue scales, Bother Index, Challacombe scale of clinical effects of xerostomia, rheometers were used.

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Procedure

Assessment of dry mouth should include subjective and objective symptoms. Salivary flow rate should be calculated (by measuring the volume over a set time), subjective signs by the Bother index or short questionnaire and objective symptoms by the Challacombe scale [4].

Composition of artificial salivas

To create viscosity, the main polymer in artificial salivas is either carboxymethylcellulose or xanthan gum. Low surface tension of artificial saliva is created by the addition of volatiles such as menthol. They also contain bioactives that are components extracted from natural sources (animals or plants) that have some of the bacteriostatic or antibacterial effects of natural saliva (Table 1).

Physical properties of artificial and natural salivas

Physical properties of saliva include:

- Viscosity
- Elasticity
- Surface tension
- Surface and bulk viscoelasticity

Other possible sources for artificial saliva

The other sources for artificial saliva currently being researched include:

- Post-transplantation of bio-engineered whole or mini-glands produced by laboratory biofabrication processes [5]
- Customized laboratory-based artificial saliva [6]
- Customized mouth splints designed to create a reservoir for longer delivery.

Pitfalls and complications

- Artificial salivas lack effectiveness.
- They do not mimic the elastic component and the pellicle-forming properties of real saliva.
- They have very low surface tension that destroys the properties of any existing saliva.
- Lack of suitable in vivo models to test artificial salivas

Table 1 Composition of artificial salivas; all compositions were disclosed as per the manufacturer’s website and/or SDS (safety data sheet)

Trade name	Bulk polymer	Actives	Preservatives	Others
BioXtra™	Hydroxyethylcellulose	Lactoferrin, lactoperoxidase lysozyme	Potassium thiocyanate	<i>Aloe barbadensis</i>
Saliveze™	Carboxymethylcellulose	Calcium chloride	Methylparaben	
GC Dry Mouth Gel™	Cellulose gum/carrageenan		Ethylparaben	
Saliva Orthana™	Pig gastric mucin	Potassium fluoride	Benzoate	Ethylenediamine-tetraacetic acid (EDTA)
Biotene™	Xanthan gum/glycerine	Cetylpyridinium chloride	Benzoate, methylparaben	
Glandosane™	Sodium carboxymethylcellulose	Calcium chloride	Sodium chloride	

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Further reading

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