Hyposalivation and Xerostomia

Etiology, Complications, and Medical Management

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KEYWORDS

• Xerostomia • Hyposalivation • Saliva • Dry mouth • Polypharmacy
• Sjögren syndrome • Salivary substitutes

KEY POINTS

- Hyposalivation is the objective, measured decrease in saliva.
- Xerostomia is the subjective feeling of a dry mouth.
- Hyposalivation is mostly caused by the anticholinergic effect of medications.
- Saliva physically protects the hard and soft tissues, lubricates, buffers the oral pH, and is a component of the immune system.
- Complications of hyposalivation are demineralization of teeth, oral candida infections, and mucositis.

INTRODUCTION

Saliva is one of the most versatile, multifunctional substances produced by the body and has a critical role in the preservation of oropharyngeal health. When dysfunction occurs, the effects on the oral environment can lead to severe consequences in the overall patient's health and in their quality of life. This article reviews the role of saliva, the hyposalivation and xerostomia, various disease processes, and their management.

HYPOSALIVATION AND XEROSTOMIA

Although the terms hyposalivation and xerostomia have been and are used interchangeably, they are actually 2 different entities. Hyposalivation is an objective finding of a decreased salivary production. The term xerostomia is the subjective feeling of having dry mouth.[1] Normal, unstimulated salivary secretory rates vary between 800 and 1500 mL per day or 0.3 to 0.4 mL per minute. A flow rate less than 0.1 mL per

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minute has been determined to be significantly abnormal.[2] A decrease in saliva production by 50% generally will result in the feeling of dry mouth, but xerostomia may occur in patients with a normal salivary flow.[3] For the most part, this article mostly covers the management of hyposalivation, but it will touch on the treatment modalities for xerostomia patients with normal salivary flow rates.

NORMAL SALIVARY FUNCTION

Saliva can be empirically divided into 2 components, mucinous and serous. These 2 components combine to form whole saliva. Whole saliva is secreted by the paired major salivary glands and the thousands of minor salivary glands. There are 3 types of major salivary glands: the parotid, the submandibular, and the lingual (sometimes called the sublingual) glands. The parotid glands mostly secrete serous saliva. The submandibular glands secrete both mucinous and serous saliva. The lingual glands and the minor salivary glands secrete only mucinous saliva.

Saliva also contains hundreds of other substances, such as desquamated cells, glycoproteins, bacteria, debris, complex mixtures of proteins, lipids, ions, and other substances. Although the purpose of many of these components is understood, there are others whose function still remains unknown.[4]

The salivary glands are innervated along the parasympathetic cholinergic pathway. When the gustatory centers are stimulated, acetylcholine is released from the nerve endings and binds to the muscarinic receptors on the salivary gland cells, particularly the muscarinic 3 receptor (M3R), triggering the release of intracellular calcium from the endoplasmic reticulum. These calcium ions activate the transmembrane sodium potassium pump, which increases the intraductal concentration of sodium ions. An ionic gradient then pulls the chloride ions from the ductules, which in turn creates an osmotic gradient that results in the secretion of fluid from the cells.

SALIVARY MUCINS

Salivary mucins serve the important function of sequestering water in the oral mucosa, acting as a lubricating agent, and as a protective layer for the hard and soft tissues of the mouth.[5] Molecularly, they comprise oligosaccharide side chains attached to a central protein strut. The major viscoelastic mucins are the gel-forming MUC5B mucin and the nonpolymeric MUC7 mucin.[6–8] These specific mucins lubricate the mucosa, protecting it from frictional and chemical damage. They also coat ingested food, allowing it to be smoothly swallowed. Mucins also surround the teeth, further protecting the teeth from demineralization and mechanical damage. It has been hypothesized that a loss or a change in concentrations of these molecules is the main etiologic factor in the development xerostomia.[9]

SALIVARY MINERALS

Saliva is rich in minerals, specifically sodium, potassium, calcium, hydrogen, bicarbonate, phosphate, zinc, magnesium, and others. These minerals, along with the salivary proteins, create an osmotic gradient between the intracellular fluid in the salivary cells and the extracellular fluid in the glandular ductules. This osmotic gradient is the driving force that brings the intracellular fluid through the transmembranous channels into the glandular ductules.

The oral pH normally stays in the range of 6.0 to 7.0 and is maintained by the different ions found within the saliva. These ions, particularly bicarbonate and phosphate, stabilize the pH and thereby limit the demineralization of the teeth from bacterial