

## Management of Xerostomia in Elderly Patients with Edentulous and Hypertension: Case Report

Ana Medawati<sup>1\*</sup>, Myrna Kania Utami<sup>2</sup>

Universitas Muhammadiyah Yogyakarta

**Corresponding Author:** Ana Medawati [medawati888@gmail.com](mailto:medawati888@gmail.com)

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### ABSTRACT

Xerostomia is defined as a subjective complaint in patients who have a dry mouth. The causes of xerostomia can be classified as systemic or local. Xerostomia can often develop as a side effect of certain medications. **Case Report:** A 72-year-old male patient came in complaining that his mouth felt dry at night and woke up because his throat felt dry and he had to drink. Patients also feel compelled to drink when swallowing food. The patient can only eat soft foods because all his teeth have been removed and he does not use dentures. The patient has a history of hypertension and is taking amlodipine and Hydrochlorothiazide which are taken once a day in the morning. **Discussion:** Identification of xerostomia was carried out using the Fox (1987) questionnaire with the results of xerostomia and measurement of saliva flow rate when the patient's indication was 0.56 mL/minute which was not hyposalivation but was still given treatment with GC dry mouth gel for subjective complaints. After the patient used dry mouth gel for 2 weeks, saliva flow rate measurements showed an increase to 0.6 mL/minute and there was improvement in the xerostomia questionnaire. **Conclusion:** The use of dry mouth gel can reduce subjective complaints and increase the rate of saliva flow in elderly patients who take hypertension drugs in the form of calcium channel blockers and diuretics

## INTRODUCTION

Saliva plays an important role in maintaining oral health. 99% of the volume of saliva is water, while the remaining 1% consists of inorganic salts sodium, potassium, calcium, and magnesium, as well as organic compounds, such as cholesterol, uric acid, and protein (enzymes)<sup>1</sup>. Saliva is very important for maintaining healthy oral tissue. In general, saliva has three main functions, namely protecting mineralized tissue from wear and tear, cleaning the oral mucosa thereby preventing dryness and oral infections, and helping digest food in the early stages with the enzymes amylase and maltase. Saliva also plays a role in maintaining oral pH in the range of 6.8–7.2 which is done through a hydrogen carbonate and phosphate buffer system<sup>1,2</sup>. It consists of 2 classifications of saliva, namely saliva that comes out when resting (resting/unstimulated) and saliva that comes out when stimulated by chewing, smelling, etc. (stimulated). The average resting saliva flow rate is around 0.3 – 0.4 mL/minute, while for stimulation it is 1 – 2 mL/minute.

Xerostomia (dry mouth) is defined as a subjective complaint in patients who feel their mouth is dry<sup>3</sup>. Based on its pathogenesis, xerostomia is divided into true xerostomia (xerostomia vera, primaria) which is caused by damage to the glands.

Salivation, or pseudo xerostomia (pseudo xerostomia) which is also called symptomatic xerostomia (xerostomia spuria, symptomatics), where the patient experiences the subjective impression of dry mouth even though the secretory function of the salivary glands is normal<sup>1,4</sup>. Xerostomia in patients who experience symptomatic xerostomia or can be diagnosed objectively by the rate of saliva flow. The diagnosis of hyposalivation is made if the stimulated saliva flow rate is 0.5–0.7 mL/minute and the unstimulated saliva flow rate is 0.1 mL/minute<sup>4</sup>.

Patients with xerostomia usually have symptoms of a dry mouth sensation, burning or pain in the mouth, taste disturbances, difficulty swallowing, and a sensation of thick saliva<sup>5</sup>. Xerostomia is not a separate clinical entity but is a sign of systemic comorbidities that cause impaired salivary gland function. The causes of xerostomia can be classified as systemic or local. Xerostomia can manifest in conditions such as Addison-Biermer anemia, Parkinson's syndrome, Alzheimer's disease, avitaminosis (B1, B2, B6, and B12), or even graft vs. graft disease. hosts. Local factors causing dry mouth include sialadenitis and sialolithiasis<sup>1</sup>. Xerostomia can often develop as a side effect of certain medications<sup>6</sup>. Drugs xerogenics can be antidepressants, diuretics, antihistamines, opioids, immunostimulants, antihypertensives, sedatives and bronchodilators. Interactions between different groups of drugs also play a role in this process<sup>4,5</sup>.

There are several changes in the structure of the oral cavity tissue in the elderly, one of which is xerostomia<sup>3</sup>. As we get older, the quality and quantity of saliva and glands decrease. In elderly patients, histological studies of the salivary glands show that although the number of ducts in the salivary glands remains the same, the volume of fat and fibrovascular tissue proportionally increases in

the parotid and submandibular glands in elderly individuals. Changes in the histology of the gland can result in decreased gland function<sup>7</sup>. Elderly patients also usually take various medications for their other health, for example, antihypertensives and antidiabetics. Analysis of the etiological factors of xerostomia supports the hypothesis that in elderly patients, this condition is not only a symptom of the unavoidable physiological process of aging but is also a consequence of the age-related increase in the number of drugs used.



Figure 1. Clinical Photo of the Patient's Oral Cavity

## LITERATURE REVIEW

Objective examination showed blood pressure 138/86 mmHg and pulse 71/minute. Intraoral examination revealed edentulous areas throughout the upper and lower jaw (Figure 1). The provisional diagnosis in this case is xerostomia. The treatment plan that will be carried out is the administration questionnaire and examination of unstimulated salivary flow rate.

## METHODOLOGY

A 72-year-old male patient came in complaining that his mouth felt dry at night. This situation does not happen every night, but patients sometimes wake up because their throat feels dry and they have to drink. The patient does not feel his throat is dry from morning to evening. The situation has been felt since 1 year ago. The patient feels disturbed at night because he has to wake up to drink so that his throat doesn't feel dry. Patients also feel compelled to drink when swallowing food. This situation has not been checked by a dentist. The patient can only eat soft foods because all his teeth have been removed and he does not use dentures.

The patient has a history of hypertension and takes amlodipine and hydrochlorothiazide once a day in the morning. The patient does not have any specific drug or food allergies. Patients drink lots of water, around more than 2 liters per day.

## RESULT

The patient came to RSGM UMY for xerostomia indications on November 22, 2023. At this meeting, subjective and objective examinations were carried out. The xerostomia questionnaire from Fox et al was administered. (1987) and measurement of unstimulated salivary rate in patients. Questionnaire indicators according to Fox et al. (1987) who used for patients are as follows:

Table 1. Question

No	Question	Yes	No
1.	What is the amount of saliva in your mouth feels a little bit?		x
2.	Do you having difficulty when swallowing?	x	
3.	Does your mouth feel dry when eat?		x
4.	Do you need to drink fluids to swallow food?dry?	x	

Next, an unstimulated salivary flow rate was examined. Based on this examination, the results were 0.56 mL/minute. From examining the saliva flow rate, it was found that the patient did not experience hyposalivation. Even though the examination of the patient's saliva flow rate did not indicate hyposalivation, the operator gave the patient GC dry mouth gel which was applied to the oral cavity in the edentulous area, inner pili, and lip area. GC dry mouth gel was given for 2 weeks and the patient was instructed to carry out control and evaluation.

#### Observation

GC dry mouth gel is given twice a day, namely in the morning when you wake up and before bed.

A gel the size of a corn kernel is applied to the oral mucosa with the help of the tongue. Dry mouth gel was given for 2 weeks and then instructed to come to RSGM UMY for control and evaluation.

#### Visit 2

The patient came for control after being given dry mouth gel for about 2 weeks. The patient feels that recently he has been sleeping better. He no longer wakes up frequently at night because his throat feels dry. Patients use the gel every day in the morning and before bed.

At this visit, measurements were taken again using the xerostomia questionnaire and the measurement of unstimulated saliva flow rate. The results of the questionnaire given to patients are as follows:

Table 2. Visit 2

No	Question	Yes	No
1.	Is the amount of water does your mouth feel a little saliva?		x
2.	Do you have any difficultieswhen swallowing?		x
3.	Is your mouth does it feel dry when eating?		x
4.	Do you need to drink fluids to swallow food?dry?		x

The results of measuring the rate of unstimulated saliva are 3 mL/5 minutes or 0.6 mL/minute. From these measurements, it can be seen that the amount of patient saliva from visits 1 to 2 increased. The patient's objective examination showed a blood pressure of 135/87 mmHg with a pulse of 72/minute.



Figure 2. Results of Measuring Saliva Flow Behavior after Being Given Dry Mouth Gel

The diagnosis of this condition is xerostomia with a treatment plan in the form of IEC and evaluation. At this visit, the patient is instructed to continue applying dry mouth gel according to the previously scheduled time to keep the oral cavity moist because the patient continues to consume xerogenic drugs.

## DISCUSSION

Xerostomia is a symptom or sign felt by a person in the form of dry mouth which is generally associated with reduced saliva flow<sup>3</sup>. The prevalence of xerostomia in the population ranges from 5.5% to 46%.

Research shows differences in the prevalence of xerostomia appear to increase with age. A possible explanation is that older people are taking some xerogenic drugs for their chronic conditions and this may lead to a decrease in the overall rate of unstimulated saliva flow<sup>4</sup>. In this case, the patient had a history of controlled hypertension and the patient was taking amlodipine and hydrochlorothiazide. One of the biggest risk factors for xerostomia is the drugs used. Additionally, polypharmacy has been shown to significantly influence salivary flow<sup>4</sup>. Subjective feelings of xerostomia may occur in patients taking blood pressure-regulating medications, antidepressants, or immunosuppressive medications. This causes decreased blood flow in the salivary glands, which can lead to reduced saliva production<sup>1</sup>. Salivary flow rate can be influenced by antihypertensive drugs directly and indirectly. These drugs will affect salivary flow directly by mimicking the action of the autonomic nervous system. On the other hand, antihypertensive drugs can indirectly affect saliva by changing fluid and electrolyte balance or by affecting blood flow to the glands<sup>8</sup>. Amlodipine is a drug.

Calcium channel blocker antihypertensives where amlodipine also closes  $Ca^{2+}$  channels so that the  $Cl^{-}$  gate does not open, causing  $Cl^{-}$  to not be able to leave the cell. This can affect the amount of saliva, causing xerostomia<sup>9,10</sup>. Another drug consumed by patients for hypertension is hydrochlorothiazide which is a diuretic, where one of the side effects is xerostomia<sup>11</sup>. Many studies have proven that patients taking diuretics have lower saliva flow<sup>12</sup>.

The patient is 72 years old, which is in the elderly category. As we get older, the quality and quantity of saliva and glands decrease. With increasing age, histological studies of the salivary glands show that although the number of ducts in the salivary glands remains the same, the volume of fat and fibrovascular tissue

proportionally increases in the parotid and submandibular glands in elderly individuals. On the other hand, the proportional volume of acinar cell secretions is reduced in elderly individuals, which is considered to be one of the main causes of dry mouth<sup>7</sup>. The results of the subjective examination from the questionnaire showed that there was a subjective complaint of xerostomia which was supported by the patient's confession when anamnesis was taken. The patient complained

Difficulty swallowing food and fluids is needed to help the patient swallow food and wakes up several times at night because the throat feels dry. The results showed that the patient had xerostomia. However, from measuring the flow rate of unstimulated saliva, no hyposalivation was found where the patient's saliva flow rate was at 0.56 mL/minute. This may occur because the patient often drinks water in the morning until noon and the saliva flow rate measurement is carried out in the morning when the patient has drunk a lot of water. This condition is in line with Villa (2014) where it is explained that patients who complain of xerostomia often do not show objective signs of hyposalivation and the symptoms may be caused by qualitative and/or quantitative changes in saliva composition<sup>4</sup>. According to Kapiolani (2022),

Management of xerostomia consists of preventing the development of oral infections, eliminating symptoms, treating oral manifestations, and improving salivary function. One way to eliminate or reduce the symptoms of dry mouth is hydration by drinking more water, avoiding xerogenic drugs, and using saliva substitutes as a symptomatic treatment. Saliva substitutes aim to increase viscosity and resemble saliva<sup>4</sup>. In efforts to improve the quality of life of xerostomia patients, various forms of saliva substitutes have been introduced in various preparations such as gels, aerosols, lozenges, mouthwash, and chewing gum<sup>1</sup>. When considering saliva substitute administration, gel formulations appear to be most efficient and appreciated by patients<sup>4</sup>. One of the gel substitutes for saliva on the market is GC Dry Mouth Gel. This gel has a neutral pH so it does not cause demineralization of the teeth, contains carboxymethyl cellulose (CMC) whose viscosity resembles saliva and mucin which makes the oral mucosa moister<sup>9</sup>. CMC is not a natural oral moisturizer, but CMC has been proven to be the best choice of saliva substitute because it can increase the viscoelastic formulation of the material<sup>13</sup>. According to research by Lam-bol et al. (2021), GC dry mouth gel can increase saliva pH towards neutral and saliva flow rate<sup>14</sup>. This also occurred in patients after being given dry mouth gel for 2 weeks, which can be seen from the measurement of the patient's saliva flow rate increasing from 0.56 mL to 0.6 mL and the reduction in subjective complaints from the patient.

Xerostomia itself is a condition that is quite crucial in the quality of life of elderly patients, as was found in Botelho's (2021) research explained that xerostomia and the stress felt by elderly patients can affect OHRQoL (Oral Health-Related Quality of Life)<sup>15,16</sup>. Xerostomia that is not treated on its own can cause patient discomfort when doing everyday things. Apart from that, xerostomia when accompanied by hyposalivation can cause a reduction in antimicrobial, antiviral, and antifungal abilities, which can cause infections with microorganisms such as *Candida albicans* and *Lactobacillus* spp<sup>17</sup>. This can cause patients to be

more susceptible to various diseases, one of which is angular cheilitis, one of the main causes of which is xerostomia<sup>18,19</sup>. Based on research by Tanaka (2021), xerostomia significantly affects the decline in denture performance<sup>20</sup>. Dry oral cavity conditions can reduce the retention and stability of denture prostheses<sup>21</sup>. In addition, dryness and a sticky feeling in the mouth can worsen chewing, tasting, and speaking problems<sup>16</sup>.

## CONCLUSION

Elderly patients who take many medications can experience xerostomia, whether accompanied by hyposalivation or not. One way that can be done is to reduce symptomatic complaints by using a saliva substitute such as dry mouth gel. In this case, the use of dry mouth gel can reduce subjective complaints and increase the saliva flow rate in elderly patients who take hypertension medication in the form of calcium channel blockers and diuretics.

## FURTHER STUDY

This research still has related limitations, so it is necessary to carry out further research on the topic Management of Xerostomia in Elderly Patients with Edentulousness and Hypertension: Case Reports in order to perfect this research and increase insight for readers.

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