Tidsskriftet Tidsskrift for Den norske legeforening

Dry mouth in the seriously ill and dying

CLINICAL REVIEW

SIRI FLAGESTAD KVALHEIM

Siri.Flagestad.Kvalheim@vlfk.no
Oral Health Centre of Expertise, Vestland County Council
She has contributed to the study concept and to the literature search, design and preparation of the manuscript.
Siri Flagestad Kvalheim, DDS, Ph.D., is a specialist in prosthodontics.
The author has completed the ICMJE form and declares no conflicts of interest.

ILEANA MIHAELA CUIDA MARTHINUSSEN

Oral Health Centre of Expertise, Vestland County Council and University of Bergen
She has provided professional advice and contributed to the revision of the manuscript.
Ileana Mihaela Cuida Marthinussen, DDS, Ph.D., specialist in cariology, associate professor and clinical director.
The author has completed the ICMJE form and declares no conflicts of interest.

EINAR BERG

Institute of Clinical Dentistry
University of Bergen
He has contributed to the design and preparation of the manuscript.
Einar Berg, BDS, Dr. Odont., professor emeritus of dentistry.
The author has completed the ICMJE form and declares no conflicts of interest.

GUNHILD VESTERHUS STRAND

Institute of Clinical Dentistry
University of Bergen

She has contributed to the study concept and to the design and preparation of the manuscript. She has also provided professional advice.
Gunhild Vesterhus Strand, Dr.Odont., professor in gerodontology.
The author has completed the ICMJE form and declares no conflicts of interest.

Dry mouth constitutes a significant problem for most patients with grave illnesses and a need for palliative treatment. The main causes are pharmaceuticals, diseases and cancer treatment, which are often associated with increasing age. The condition may give rise to discomfort, pain, dysphagia, speech problems, increased caries activity, dehydration, malnutrition and loss of appetite. There are few evidence-based remedies against this condition. An apparently trivial problem like dry mouth may therefore cause deterioration of the clinical picture and a reduced quality of life.

A study of a representative selection of Norwegian hospitals and nursing homes published in 2016 showed that 25 % had no oral care procedures for seriously ill patients, and only half of the nursing staff realised the importance of such care (1). Among institutions that did have procedures, more than 20 different products were used, many without documented effect or even with harmful effect. For seriously ill patients in Norway, it is therefore a matter of chance *if* they receive oral care and what procedures and products are then used.

When seriously ill patients receive treatment and medication with quite troublesome side effects, health care intended to relieve the ailments is not always offered (2). Oral infections increase the risk of cardiovascular disease, reduced cognitive function and pneumonia, among other things (3). Implementing routine daily oral care in cases of serious disease alleviates and reduces this risk (4).

This article sheds light on causes and possible treatments for dry mouth. The overview is based on our own studies of Norwegian health institutions, available literature, clinical experience and existing routines for oral care in seriously ill patients.

What is dry mouth?

Healthy individuals produce approximately 0.6 litre saliva per day (5). Dry mouth occurs when saliva secretion is less than the loss of liquid from the oral cavity due to deglutition, evaporation and absorption through the mucous membrane (6). *Xerostomia* is the patient's subjective feeling of dry mouth;

hyposalivation is the objective and measurable dry mouth. The two concepts do not always coincide. Saliva secretion outside mealtimes is normally 0.3 ml/min. Less than 0.1 ml/min is defined as hyposalivation. Xerostomia occurs when secretion is reduced to about half the normal quantity (7), but may also be a result of changes in the composition of the saliva (8). In such cases the saliva may become viscous, stringy and/or frothy.

Saliva

Saliva is a complex body fluid with a number of different properties and functions. Its main content is water (99.5 %). In addition, saliva contains electrolytes and proteins (9). The liquid promotes cleansing of the oral cavity. Different salivary enzymes and proteins have antimicrobial, antifungal and antiviral properties.

Immunoglobulins, like s-IgA, inhibit microbial adhesion and promote phagocytosis and aggregation. Mucin creates a protective membrane. Growth factors in saliva facilitate proliferation and wound healing (8). Saliva is important for taste because it contains proteins that contribute to decomposition of nutrients and transport of taste substances to the taste buds (10). Saliva is also important for mastication, deglutition, formation of food bolus and for digestion, and its buffer capacity plays an important role in dental health and in maintaining a balanced oral microbiota (8).

Who is affected by dry mouth?

Dry mouth occurs at all ages, but a chronic and serious degree of dry mouth affects especially the elderly with polypharmacy, chronic and/or terminal diseases (8, 11, 12). The condition affects more often females than males. Dry mouth means that saliva's cleansing and lubricating effect is absent. If saliva is virtually absent, the mucous membranes often have a leathery appearance. A burning and stinging sensation, cracks, wounds, pain, reduced taste sensation and speech problems occur frequently. The condition increases susceptibility to infections (8, 13), and complicates swallowing of food and drink. This may lead to malnutrition, reflux, nausea and dehydration (14). In patients with a longer life expectancy, caries with consequential damage may occur.

Dryness extending down the throat, frequently in combination with candida infection, is another very uncomfortable affliction affecting the seriously ill and dying (14). The condition is not always discovered during routine examinations. Because of general impairment, patients may have problems communicating their symptoms. Dry mouth and oral infections are often accompanied by halitosis – bad breath – which can be repulsive and reduce the patient's self-respect and dignity. An apparently trivial condition such as dry mouth may therefore lead to a significant deterioration of the patient's physical and mental health and well-being.

Causes

Reduced secretion may be caused by structural changes in the salivary glands due to radiation, immunotherapy or autoimmune diseases, or pathophysiological changes in the salivary glands caused by endocrine disorders (8, 15). Other conditions can be temporary, such as sialolithiasis (salivary gland stone), dehydration, anxiety and depression (16). There are no specific clinical signs that distinguish between different causes of dry mouth (8).

The most common causes of dry mouth are the side effects of treatment and pharmaceuticals that affect the salivary reflex on different sites in the central nervous system and/or at the receptor level in the salivary glands (16). In cancer patients about 80 % are afflicted by dry mouth (17-19). More than 150 active ingredients affect the salivary function (20). Polypharmacy further increases the effect (16, 21). Opioid analgesics, sedatives, antidepressants, anxiolytics, neuroleptics and anticholinergics used frequently in palliative treatment, especially for terminal patients, all give rise to dry mouth (8, 20). Moreover, in palliative patients, low intake of fluids, fever and medication can influence the regulation of the salt-liquid balance and lead to dehydration. For seriously ill patients, dry mouth is worsened by mouth breathing, damaged or very thin oral mucosa that may increase the absorption of liquids, and by damaged or missing salivary glands (C. Dawes, personal communication).

Treatment

Oral care

Oral care in the seriously ill and dying should include identifying and diagnosing dry mouth, lubricating lips, cleaning teeth, cleaning and moistening the mucosa (22). The teeth should be cleaned with a soft brush. Toothpaste containing sodium lauryl sulphate should be avoided because this cause dehydration of the mucosa (23). The mucosa should be cleaned with physiological saline, possibly with 0.5 % hydrogen peroxide. Application of a 17 % glycerol solution may be used as a moisturiser. This solution relieves dry mouth, but must be frequently applied because the effect is short-lived (24). The products/procedures that have a relieving effect vary with the type and degree of dry mouth and the patient's preference. On very dry mucosa, products with high viscosity can appear sticky and uncomfortable. Nausea frequently occurs in patients in palliative care. Products with a mild taste and pleasing consistency are therefore important. Because the symptoms and preferences vary, patients ought to try different types (2, 24).

Saliva substitutes

A number of saliva substitutes exist – rinsing products, gels, sprays – claiming to relieve dry mouth. These often mimic the appearance and viscosity of saliva, but have not the equivalent enzymatic, antimicrobial, antifungal or antiviral properties. Nor do they have the physical properties of saliva (16). As of today, there is no strong scientific evidence that any of the products on the market provide effective relief against dry mouth (2).

Glycerol

Glycerol in aqueous solutions has been the most used product in oral care and for dry mouth in Norway since the 1950s. However, there are conflicting recommendations regarding glycerol. In some countries its use is discouraged because it is claimed to be desiccating rather than moisturising. In Norway a 17 % glycerol solution is recommended. This recommendation, made by Helsebiblioteket.no, is based on empirical data and available literature and is the closest thing to a national guideline (22). This glycerol solution provides good immediate relief, but the effect disappears after a short period of time (24). The long-term effect of such a glycerol solution on mucosa is unknown, but it seems unlikely that short-term use would cause any particular problems. However, undiluted glycerol has also been used on mucosa by some Norwegian health institutions (1). This may cause great discomfort and a significant deterioration of dry mouth. If a glycerol solution is used, it should be mixed with water at a ratio of 1:4 and applied frequently (24).

Stimulation of saliva secretion

Saliva secretion can be augmented by using chewing gum, lozenges and apple, lemon or ascorbic acid (16). Palliative patients with hyposalivation may have difficulties dissolving lozenges. Chewing gum is often unsuitable due to insufficient chewing force (18).

Pilocarpine is a muscarinic agonist augmenting the secretion of exocrine glands and may provide effective treatment against xerostomia with dosages of at least 20 mg per day (25). However, usage entails unwanted side effects like perspiration, headache, urination and vasodilation (26). Pilocarpine tablets (Salagen) may only be prescribed (in Norway) on approval exemption. An unapproved indication, practised in several countries, is Pilocarpine eye drops 2 % per os; 3 - 5 drops 2 - 5 times daily. This may provide a good, but short-term effect (27). However, medication that stimulates secretion is only effective in patients with salivary glands that have some remaining function.

Artificial hydration

Treating dehydration may reduce afflictions associated with dry mouth (28). Artificial hydration entails fluids given intravenously, subcutaneously, dermally, rectally or as a component of enteral or parenteral nourishment. In palliative patients, artificial hydration is challenging due to physical factors like fluid retention and pulmonary oedema, but also for moral, ethical and cultural reasons. Discontinuation of fluids and nutrition in dying patients is a matter of contention in the literature (29). Supplying fluids may prevent kidney failure

and delirium as well as improving the effect of medication. Counter-arguments are that unwanted accumulation of fluids should be avoided, that the patient should be spared catheters and that one should rather focus on the impending death. It is uncertain to what extent supplying fluids reduces dryness and thirst (30). The fact that oral care can alleviate dry mouth, is an argument against hydration. A prerequisite then is that oral care is actually implemented.

Conclusion

Most seriously ill and dying patients are severely afflicted with dry mouth. Products to relieve the condition are not very effective, but adequate cleaning and frequent moisturising can alleviate the ailments. The health service should routinely include oral care for admitted patients in line with treatment for other illnesses.

The article has been peer-reviewed.

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Publisert: 10 February 2022. Tidsskr Nor Legeforen. DOI: 10.4045/tidsskr.21.0232
Received 22.3.2021, first revision submitted 3.9.2021, accepted 5.1.2022.