



Case Report

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Management of Dysgeusia in Stroke Patients in Dental Office



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Abstract

Stroke is a syndrome that causes a global or focal disorder of brain function. The bad taste in the mouth manifested on occasion by these patients is called dysgeusia and is defined as a qualitative taste disorder that can seriously compromise their well-being and quality of life. The present case supports a comprehensive management of this type of patients based on motivation of oral hygiene, management of xerostomia with salivary stimulators and systemic management with zinc supplements.

Keywords: Stroke; Dysgeusia; Quality of life; Oral hygiene; Saliva; Salivary stimulators; Zinc; Dental office

Introduction

Stroke is a syndrome that causes a global or focal disorder of brain function. Its development is accelerated and symptoms can last 24 hours (transient ischemic attack) or more. It affects approximately 15 million people each year, causing around 6.2 million deaths [1]. They can be ischemic or haemorrhagic. In the first case, ischemia is caused by thrombi covering a ruptured atherosclerotic plaque in the cerebral arteries, emboli or particles originating in the bone marrow, metastatic cells or blood clots. In the second type, the cause is the rupture of a cerebral vessel that causes an increase intracranial pressure [1-3]. When stroke does not cause death, it produces a decrease in neurological function, with motor impairment and whose clinical consequences will depend on the extent of neurological damage [2-4]. Orofacial disorders are frequent after a stroke and include: facial paraesthesia, disorders in mastication -hemiplegia in the muscles of mastication- and swallowing -hemiplegia in the muscles of the pharynx, tongue and palate-, disorders of the speech, decreased salivary secretion, poor oral sensation and finally, associated with hemiparesis of the upper extremities, difficulty oral hygiene habits [1-5]. Dysphagia and the inability to chew can cause decreased nutrient intake in almost 80% of patients [1,4]. The quality of life of patients after a stroke is affected due to the deterioration of physical, psychological and social functions. Disability, post-stroke depression and cognitive impairment are determinants of low quality of life related to oral health [3,6].

The bad taste in the mouth manifested on occasion by these patients is called dysgeusia and is defined as a qualitative taste disorder that can seriously compromise their well-being and quality of life [7,8]. On the one hand, it interferes with social behavior and daily life -avoiding meals-, but it can also cause changes in diet, weight loss, malnutrition or overweight, due to the excessive use of salt and sugar to compensate for the bad taste [8-10]. Dysgeusia is difficult to estimate due to the difficulty in evaluating it quantitatively or qualitatively, in addition to the fact that the perception of flavor is carried out jointly between the senses of taste and smell [10]. Taste's sense is carried by three cranial nerves: the chorda tympani branch of the facial nerve (cranial nerve VII); glossopharyngeal nerve (cranial nerve IX) and vagus nerve (cranial nerve X) [7,10]. Taste buds extend from the basal lamina to the surface of the tongue. Their apical microvilli extend to contact chemicals via G protein-coupled receptors and ion channels. Cells receive taste from the apical pore which transmit the signal through the commented nerves to the nucleus of the tractus solitarius in the brainstem, and then it is transmitted to the thalamus and cortex [7,9,10]. Heckmann et al., reported in a prospective observational study that 30% of patients with stroke had decreased sense of taste [11].

On the other hand, taste disorders can be affected by different mechanisms. The most frequent are drug use (21.7%) and systemic

diseases such as gastroesophageal reflux or kidney disease (6.4%). To a lesser extent: disorders in the nervous system such as paralysis, trauma, tumor, epilepsy, cerebrovascular accidents and surgical operations (damage to the chorda tympani), viral infections of the upper respiratory tract, human immunodeficiency virus and hepatitis C virus and conditions related to oral health (xerostomia, oral hygiene and use of dentures) [7,9,10]. Different treatments have been proposed for the management of dysgeusia, including transcranial magnetic stimulation, therapy with tricyclic antidepressants (amitriptyline, imipramine, among others), benzodiazepines (clonazepam or diazepam), gabapentin, zinc supplements, ginkgo biloba, alpha lipoic acid, pilocarpine and salivary substitutes. Alternative treatments such as acupuncture, intake of biotin, glutamine, ice cubes in the mouth, improvement of oral hygiene and local oral anesthesia have also been proposed [9,10]. As stated above, evidence show that dysgeusia can manifest from a wide variety of systemic antecedents, so its treatment should be individualized. The aim of this report is to propose an individualized treatment for a patient affected by dysgeusia because of a stroke.

Case Report

A 68-year-old male patient attended the Preventive Dentistry service of the Dental Hospital of the University of Barcelona. Reason for consultation: bad taste of food. Medical history: Bilateral stroke in the thalamus in 2017, hypertension, rheumatic fever, depression and sleep apnea with daily use of

a CPAP device. Medicated with: Adiro® (Acetylsalicylic Acid), Bisoprolol® (Beta-blocker), Citalopram® (Antidepressant), Losartan® (Antihypertensive), Omeprazole® (Gastric Protector), Prevastatin® (Management of hypercholesterolemia), Tromalyt® (Antiplatelet agent), Fluoxetine (Antidepressant). Oral hygiene habits: Electric toothbrush (OralB oscillating rotary®, Procter & Gamble, Spain), fluoride toothpaste (Sensodyne®, GlaxoSmithKline, Spain), mouthwash (Bexident® Encías, ISDIN, Spain), interproximal brushes. Oral hygiene frequency: occasional (2 to 3 times a week).

On oral examination, it was observed: 28 natural teeth in the mouth and a dental implant in position 27, coated tongue, inflamed gums and generalized erythematous. Dental plaque index 100% (O’Leary Plaque Index). Complementary salivary tests were carried out: Normal unstimulated salivary flow 0.2ml/min. Salivary flow stimulated 0.8ml/min. Salivary tests using the Saliva- Check Buffer® Kit (GC Corp., Tokyo, Japan); pH: 6.8 normal. Buffer capacity: 7 low. Table 1, [12,13] shows the reference values to calculate the degree of involvement of our patient, according to the tests performed. To assess dysgeusia, the patient answered a questionnaire adapted from that used by Pontecelli et al. in cancer patients [14]. As a result, patient reported that following flavors: salty, sweet, sour, bitter and spicy were affected and he adopted the strategy of consuming foods with more olive oil. Finally, a questionnaire on quality of life related to oral health was performed and patient reported that an unpleasant and indescribable taste of food predominated after the stroke [15].

Table 1: Reference Values for Salivary Tests [12,13].

| Category | Unstimulated Salivary Flow | Stimulated Salivary Flow |
|-----------------|----------------------------|--------------------------|
| Normal | 0.25-0.35ml/min | 1.0-3.0ml/min |
| Low | 0.10-0.25ml/min | 0.7-1.0ml/min |
| Very low | <0.1ml/min | <0.7ml/min |
| Category | pH | |
| Highly acid | 5.1-5.2-5.4-5.6-5.8 | |
| Moderately acid | 6.0-6.2-6.4-6.6 | |
| Healthy saliva | 6.8-7.0-7.2-7.6-7.8 | |
| Category | Buffer Capacity | |
| Very low | 0-5 | |
| Low | 6-9 | |
| Normal | 10-12 | |

These questionnaires were also carried out at the end of our intervention

The treatment and management of dysgeusia was proceeded from an individualized strategy based on the control of biofilm and the reinforcement of environment of oral cavity: Professional

dental prophylaxis was performed, oral hygiene habits were reinforced, and the use of a tongue cleaner was introduced. Xeros® (Dentaid, Spain) was prescribed to use during the day and Xeros®gel (Dentaid , Spain) at night. Zinc supplements as 15 mg tablets, once a day, was prescribed too as a systemic treatment

for dysgeusia. Recall were carried out for evaluating oral hygiene habits and performing salivary tests. The results are presented in Table 2. Fifteen days after the first visit, a first control is carried out to assess the intervention in the patient's oral hygiene habits. He refers that he uses an electric brush 2-3 times a day, toothpaste, mouthwash, tongue cleaner 2 times a day, interproximal brushes 1 time a day. He presented a plaque index of 25%. One month after pharmacological treatment with zinc supplement and saliva's stimulators, the patient reports improvement in the perception of flavors and a moister mouth. Salivary tests: Unstimulated

Salivary Flow 0.3ml/min. Stimulated Salivary Flow 1.4 ml/min. pH 7 Healthy saliva. Buffer capacity 9. At three months, plaque index score was 37.9%. During that visit, he referred a new pharmacological prescription by neurologist: Trazodone 100 mg due to sleeping difficulty. Last visit was carried out at fourteenth month of treatment and the perception of flavors is remained and results of salivary tests were unstimulated salivary flow 0.8 ml/min, stimulated salivary flow 1.32 ml/min. pH 7 healthy saliva. Buffer capacity 8. However, index plaque score was increased to 62.5%.

Table 2. Salivary tests performed on the patient.

| Time | Unstimulated Salivary Flow | Stimulated Salivary Flow | pH | Buffer Capacity |
|-----------|----------------------------|--------------------------|-----|-----------------|
| Initial | 0.2ml/min | 0.8ml/min | 6.8 | 7 |
| 1 month | 0.3ml/min | 1.4ml/min | 7 | 9 |
| 4 months | 0.2ml/min | 0.8ml/min | 6.6 | 9 |
| 8 months | 0.2ml/min | 1.4ml/min | 7 | 8 |
| 14 months | 0.8ml/min | 1.3ml/min | 7 | 8 |

Discussion

Maintaining good oral care and patient awareness is essential for general health and quality of life [5]. Patients who have had a stroke primarily present with motor impairment, which restricts functions associated with movement and muscle mobility. Deficits in oral functions affect almost 80% of patients [4]. Survivors of a stroke also present dental caries, periodontitis and tooth loss, combined with a low frequency of visits to the dentist, therefore it is important to know the oral health status of these patients in order to improve their quality of life [6]. Different treatments have been described for the management of dysgeusia. Oral hygiene procedures show that cleaning the tongue improves the perception and recognition of salty and sour tastes [10]. Saliva stimulants and substitutes, such as pilocarpine for 3 months improve taste disturbances [9,10]. The use of proton pump inhibitors and H2 blockers; Omeprazole decreases taste disturbances by improving recognition of sweet, salty, and sour tastes, and bitter tastes improve with H2 blockers [10]. L-thyroxine improves taste perception in patients with hypothyroidism [10]. Alpha lipoic acid, occurs naturally in human cells, improves nerve induction thus improving taste perception [9,10]. The use of local anesthetics such as 1% [10] dyclonine rinses showed a decrease in dysgeusia in patients with burning mouth syndrome. Gingko biloba, an herbal extract used for the treatment of memory loss and brain shock, is suggested to be useful for taste disturbances [9]. Transcranial Magnetic Stimulation (TMS) stimulates specific parts of the brain by inducing weak electrical currents with minimal discomfort; repetitive It has been used to treat phantamasgeusia (unpleasant taste in the absence of food or drink) [9]. Acupuncture is a key component of traditional Chinese medicine used to treat different conditions including dysgeusia [9].

Zinc is an essential trace element in the body. Zinc deficiency causes symptoms of immune disorders, skin disorders, dysgeusia, immune disorders, and mental disorders, and high zinc levels can trigger nausea, vomiting, fever, and headaches [16]. Zinc has functions of maintenance and repair of the taste buds; it influences the synthesis of the taste protein linked to the production of taste buds. The decrease in salivary taste is associated with taste and smell disorders and can be effectively treated with zinc supplements. Zinc supplementation has been shown to be effective in the treatment of taste disorders [9,10]. Zinc improves the taste of cancer patients undergoing radiotherapy and is used as a prevention of dysgeusia [10,17,18]. This case presents shows a patient with a medical history of stroke, polymedicated and with dysgeusia after the event. He is a patient with poor oral hygiene and episodes of depression associated with stroke and dysgeusia. Having had the stroke in the thalamus, the neurons that carry information from the sense of taste may have been affected, making food unpleasant. What could make dysgeusia irreversible, however, the patient also presents xerostomia and poor oral hygiene as mentioned.

Oral interventions in both young and adult patients have been shown to improve the sense of taste [7,10]. The tongue is covered with a biofilm of bacteria, desquamative, and residual saliva (mucins, amylases, cystatins, and proline-rich proteins). Flavors need to diffuse to reach taste pores and interact with taste receptors. The coated tongue physically limits the access of flavors to the pores and prevents their binding to taste receptors [10]. The patient was recommended to use a tongue cleaner 3 times a day and its use was taught in the dental chair. Tongue cleaning can suppress oral malodor by eliminating volatile compound-producing bacteria and improving chemosensory perception

[10,19]. Saliva protects the external environment of taste receptor cells and acts as a solvent and transport medium for flavors [8]. Therefore, the decrease in this will affect the ability to perceive flavors. Nearly 45% of medications known to cause drug-induced taste disturbances are reported to have dry mouth as an adverse effect [8]. Omeprazole is a commonly prescribed medication that can cause taste disturbances [7].

In this case, to balance the environment of the cavity, it was decided to stimulate the production of saliva such as products for topical use. The use of pilocarpine was not contemplated, due to polymedicated condition of the patient, treated also with bisoprolol. Saliva substitutes are considered treatment alternatives and are available in aerosols and gels, they are used as a replacement for natural saliva, mimicking its functions and lubricating the oral mucosa, although the effects are short-lived, and several applications are needed per day [20-22]. The use of Xeros spray and gel (Dentaid, Spain) containing malic acid (sialologist), sodium fluoride and xylitol as active principles was recommended; it relieves the symptoms of hypo salivation and improves the patient's quality of life [21,22]. Its use as a spray during the day and as a gel at night was recommended. Due to the use of CPAP, the patient reported dryness and discomfort in the mucous membranes every morning. With this intervention, patients increased salivary flow and improved comfort when eating.

Zinc supplementation was chosen as a systemic treatment for dysgeusia based on the evidence in patients with head and neck cancer. This type of patient can be subjected to radiation treatment and/or combined with chemotherapy, which causes transient dysgeusia. Usually, this dysgeusia is treated with 45mg zinc tablets, 3 times a day -high concentration-. This prescription remains during radiotherapy until the patient regains taste. It is a safe treatment, but it is not exempt from side effects such as: eczema, nausea, abdominal pain, diarrhea and constipation that must be monitored [9,18]. In our case, by consensus together with patient's primary care physician, we decided a low concentration dose of zinc since it involves a longer period. The drug Nutralie Zinc® 15mg once daily for 14 months was selected. The treatment was tolerated by the patient without presenting side effects. After 14 months of our intervention, patient distinguished the flavors of food again and the unpleasant taste disappeared.

Conclusions

Dentists must know the importance of managing orofacial functions experienced by patients after a stroke and the role of care to diagnose, treat, prevent, and promote health in these patients. Evidence regarding the management of dysgeusia is limited and more studies are needed to guide oral health professionals in the treatments and behaviours to be followed in patients with sequelae of strokes. The present case supports the comprehensive management of this type of patients based on motivation of oral

hygiene, management of xerostomia with salivary stimulators and systemic management with zinc supplements- to improve the quality of life related to oral health.

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