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**IDIOPATHIC TASTE IMPAIRMENT IN A YOUNG WOMAN: A CASE REPORT**

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**ABSTRACT**

**Background:** The underlying cause of taste impairment includes damage in the central or peripheral nervous system, nutrition deficiency, systemic disease, or idiopathic. This condition usually occurs with advancing age. Taste alteration may affect the patient's psychological aspect and causing malnutrition or even develop into more serious health problems. **Purpose:** This report aims to evaluate an unusual partial ageusia in a young woman and to review articles with idiopathic taste disorders. **Case:** A 33-year-old woman was referred to the Department of Oral Medicine from the neurology department with a primary diagnosis of migraine and median nerve mononeuropathy. The patient also complained of loss of tastes (salty, bitter, and sour) accompanied by numbness on the palate and left buccal mucosa for the past two weeks. **Case Management:** The patient was given a 0.12% chlorhexidine digluconate mouthwash and 25 mg zinc tablets twice a day. After 2 weeks, she can identify bitter, and followed by sweet and sour in the next few weeks, as well as improvement of the numbness. Eighteen studies of idiopathic taste disorders from 1991-2021 have been reported in the literature. **Conclusion:** Taste disorders with unknown aetiology may happen in young individuals. Zinc has been proven as a beneficial micronutrient to treat patients with idiopathic taste impairment. Dentists should consider this approach to resolve the symptoms and accelerate the healing process of possible co-occurrence systemic diseases.

**Keywords:** Ageusia, idiopathic, Taste dysfunction, Treatment

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**INTRODUCTION**

Taste perception is one of the essential factors in a person's life, especially to obtain energy and nutrient intake to maintain the physiology of the body.<sup>1,2</sup> Nevertheless, it is often ignored by some people. The data shows that more than 200,000 people/year visit a doctor for chemosensory problems such as taste disorders.<sup>3</sup> A survey in the United States using the Chemical Senses Questionnaire (CSQ) reported a fairly high prevalence (18.7%) of taste disorders in the general population.<sup>4</sup> A complete loss of taste or ageusia is scarce, around 1 or 2 out of 1000 people.<sup>5</sup> However, this number has risen since the COVID-19 pandemic because one of the symptoms of SARS-CoV-2 infection is taste and smell disturbances.<sup>6</sup>

Intrinsic factors, such as sex, age, and weight can modulate a person's taste perception.<sup>7</sup> Women have better taste abilities than men throughout childhood, adolescence, and adulthood. In general, taste function decreases with age, but usually does not result in a complete loss of taste.<sup>5</sup> Young and middle-aged adults have the best perceptions of taste. Older children have better

taste than younger children, and the elderly over 65 years commonly experience decreasing taste buds functions. Overweight and obesity negatively affect taste perception in both children and adults.<sup>7</sup>

A person's ability to taste is a combination of 5 basic components, namely sour, salty, sweet, bitter and umami. Sweet is located at the tip of the tongue, bitter at the posterior, salty and sour tastes are felt on the lateral edge of the tongue while umami is quite a new term that described as savoury, created by the combination of glutamate with 5'-ribonucleotides.<sup>2,3,8,9</sup>

Dentists are often the first to receive complaints about taste perception changes. Proper investigation of etiology is the most important step in the management of taste disorders. Therefore, dentists need to understand the various causes of taste disorders and their appropriate treatment.<sup>1</sup> The purpose of this case report is to assess an idiopathic partial ageusia in a young woman as well as a review of 15 studies regarding idiopathic taste disorders.

## CASE

A 33-year-old woman came to Hasan Sadikin General Hospital (RSHS) Bandung due to a headache. It was initially experienced 10 years ago, but had worsened in the last 1 month accompanied by pain in her shoulder joint. The patient was diagnosed with migraine (differential diagnosed with headache/secondary cephalgia), median nerve mononeuropathy, and osteoarthritis at the region shoulder joint by the Neurology Unit. She was given 0.9% NaCl intravenous (IV), corticosteroids, paracetamol, folic acid, CaCO<sub>3</sub>, codeine, omeprazole, and ceftriaxone tablets.

On day 6, the patient was referred to the Oral Medicine Department to screen the possible source of infection. The patient had a history of oral discomfort for the past 2 weeks with slight swelling of the cheeks and face. It started as a tingling sensation followed by taste impairment, which is loss of sweet, bitter, and sour (she can only taste the salty flavour). This leads to the loss of appetite, but her sense of smell was normal. From the intraoral findings, we found that the patient felt a tingling sensation on the tongue, but the palate and left buccal mucosa were sensed

during palpation. There are no difficulties on tongue mobility or in swallowing (Figure 1). There are no history of tooth extraction or oral surgery, and there are no routine medications. The patient was then diagnosed with idiopathic partial ageusia, and paraesthesia of the tongue, palate and left buccal mucosa.

## CASE MANAGEMENT

After a thorough history taking and examination, the patient was instructed to maintain oral hygiene and given a 0.12% chlorhexidine digluconate mouthwash.

During the first week of evaluation, there were no significant changes (Figure 2). We then added 20 mg zinc tablets twice a day, and fortunately, the week after, the patient taste sensation was gradually improved. She was able to taste bitter, and the tingling sensation in the left posterior palate and the tongue was decreasing. One week afterwards (Figure 3), although it was not completely back to normal, the patient was able to taste sweet and sour, and the paraesthesia has been resolved. Patients are still advised to continue the previous instructions.



**Figure 1. Intraoral findings on the first visit showed no visible lesions and no mobility restrictions.**



**Figure 2. Intraoral findings on the first control**



**Figure 3. Intraoral findings on the third control**

Source: figures courtesy of the authors (informed consent was obtained from the patient).

## DISCUSSION

The tongue is covered with many papillae. Out of the four types, filiform is the most numerous one. It appears as short rough structures covered with thick keratinised epithelium and has no taste buds. The other three, fungiform, foliate, and circumvallate, together with the palate and epiglottis have taste buds that possess chemosensitive taste receptors that detect the taste molecules. Taste buds contain 3 types of taste receptors, namely type I, II and III that detect salty;

sweet, bitter and umami; and bitter, consecutively.<sup>1,2,8</sup> Each taste buds contain from 50 to 100 taste receptors. In type II cells, the T1R taste receptor family detects sweet and umami can be found in the fungiform and circumvallate papillae and the T2R taste receptor family which detects bitter is found in the circumvallate and foliate papillae. Taste buds may undergo renewal, differentiation, and ongoing cellular degeneration. The average life span of taste buds in an adult is

estimated at 8-12 days, but a subset of taste buds can persist for very long periods.<sup>10</sup>

The taste sensation is a complex human experience that depends on the integration of neural input from taste receptors on the tongue supplied by the glossopharyngeal and chorda tympani nerves, and the sense of smell supplied by the olfactory nerve.<sup>7</sup> Although taste disorder is not a life-threatening condition, it can cause discomfort that leads to loss of appetite, obesity or weight loss, impaired health problems such as hypertension, and in some cases may interfere with the patient's regular drug use which eventually may result in medical problems, or may affect the psychological aspect.<sup>3,5,8</sup> This condition is also experienced by our patient where her prolonged headaches followed by partial ageusia that affected the food intake and psychological conditions.

Taste disturbances can be classified according to two principles: the type and location of the lesion.<sup>1</sup> Based on its type, taste disturbances can be grouped into quantitative and qualitative disorders. Quantitative disorders include hypergeusia (increased sensitivity to taste), hypogeusia (decreased taste sensitivity), dysgeusia (confusion of taste), and ageusia (complete loss of taste). Hypogeusia and ageusia can be total or partial. While the qualitative disorders can consist of parageusia, pseudogeusia, phantogeusia and agnogeusia.<sup>1,2</sup> In our case, the loss of taste experienced by the patient is a loss of sweet, bitter and sour taste. According to Fikentscher (1987), the classification of taste disorders based on the location can be caused by epithelial disorders (impaired taste detection due to disorders of the mucosa and taste buds), nervous disorders (damage in the transmission and perception of taste stimuli due to nervous disorders) and central disorders (central lesions), such as brain tumours, surgery, head trauma, Alzheimer's disease, etc.<sup>2</sup>

To further investigate and support the management of our patient, we have done a literature search of the Pubmed electronic database using keywords "taste disorders", "idiopathic", and "treatment", and found 15 articles consisting of 1 case reports and 14 experimental studies from 1991-2021 (Table 1). Our search reveals that taste disorders occur between the ages of 10-88 years and are more common in females. Out of 15 articles, hypogeusia is the most common taste disorder, but some experience ageusia and dysgeusia, and some articles do not mention the specific type of taste disorder. Ageusia is a rare condition,<sup>5</sup> and from the literature search, we only found 2 articles with this diagnosis. However, since COVID-19 pandemic, ageusia and anosmia has become a concern because they serve as the important clues for diagnosis, which usually occurs in the early stages of the disease, and self-limiting within 3 weeks.<sup>11</sup>

Taste disorders can be caused by broad factors including diseases of the tongue, systemic conditions (radiotherapy, chemotherapy, pregnancy, menopause), systemic diseases, infections, oral habits, nutritional deficiencies, medications, salivary dysfunction, problems in the upper respiratory tract, disorders of the peripheral or central nervous system (head trauma, cerebral infarction, cerebral haemorrhage, brain tumours, migraines, neurological diseases such as Alzheimer's, Parkinson's, stroke, epilepsy, Bell's palsy), dental origin or dental procedures, and others (ageing, burning mouth syndrome, idiopathic).<sup>2</sup> Whereas idiopathic taste disorders can occur due to congenital abnormalities and loss of taste buds or taste buds function. Some inherited disorders can include Familial dysautonomia, Turner's syndrome, pseudohyperparathyroidism, facial hypoplasia syndrome and cleft palate.

The cause of loss of taste or taste function is due to damage from various lesions and neuropathic disorders that affect the taste buds.<sup>12</sup> When the taste disorders are caused by the nervous system, it may occur from the central and peripheral nervous systems.<sup>2</sup> Lesions of the peripheral nervous system may be associated with syndromes affecting the facial, glossopharyngeal, or vagal nerves, with the facial nerves being most commonly affected. In idiopathic 7th nerve palsy (Bell's palsy), taste dysfunction can be the predominant and sometimes the earliest symptom.<sup>13</sup>

Taste dysfunction due to lesions of the central nervous system is rare. It is a result of disturbances in the taste pathways originating from the brainstem level that include the solitary tract nuclei to the cortical. Although uncommon, migraines and headaches may also be considered as the cause of taste disturbance.<sup>28</sup> In our patient, the loss of taste disturbance may be idiopathic but her nervous system disorders (migraine and headache) might be taking part. However, there is not enough evidence to prove this assumption.

In conducting a clinical evaluation, there are four basic components including detailed history taking, physical examination, psychophysical evaluation, and medical imaging.<sup>1,2,12</sup> Comprehensive anamnesis plays an important role in investigating aetiology. The events frequently associated with the onset of the complaints, provide the most important clues about the cause of the taste disorder. A detailed medical and dental procedures (e.g., tooth extraction, surgery, type of toothpaste and mouthwash used) may also be considered as the underlying factors. Abnormalities seen in the oral and nasal cavities can provide important information and focus attention on local factors to explain the development of taste disorders. A thorough oral examination should be performed, including an assessment of possible abnormalities in the oral

microbial flora. Psychophysical evaluation is important to corroborate the patient's complaints, determine the efficacy of treatment, and measure the extent of permanent damage. The practitioner must also be sensitive to the patient's psychological state. Depression may be contributing to the

complaints and taste problems, and in this case, advising psychological counselling should be considered. Medical imaging is useful to detect an inflammatory process in the oral cavity, nose, and paranasal.<sup>1,2,12</sup>

**Table 1. Summary of the idiopathic taste impairment studies**

No	First author, year.	Number of total subjects	Etiological diagnosis (number of subjects)	Age (years)	Gender	Taste Impairments	Duration of disorder	Treatment	Examination
1	Yoshida et al., 1991 <sup>14</sup>	65	Idiopathic 37, zinc deficiency 15, drug-induced 9, others 4	N/A	N/A	Hypogeusia	N/A	Zinc gluconate 158 mg	FPD
2	Kitagoh et.al., 1995 <sup>15</sup>	119	Idiopathic 45, drug-induced 38, zinc deficiency 36	N/A	N/A	Taste impairment	N/A	Zinc	FPD, EGM
3	Sakai et.al., 1995 <sup>16</sup>	N/A	Zinc deficiency, idiopathic	N/A	N/A	Taste impairment	N/A	Zinc picolinate	FPD, WMT
4	Femiano et.al., 2002 <sup>17</sup>	44H	Idiopathic 44	18-67	18 M, 24 F, 2 U	Dysgeusia	N/A	Alpha lipoic acid, 200mg/8 hrs for 2 months	N/A
5	Sakai et.al., 2002 <sup>18</sup>	73	Idiopathic 48, zinc deficiency 25	23-79	26 M, 47 F	Taste impairment	N/A	29 mg zinc picolinate, 3 times a day for 3 months	Subjective symptoms and WMT
6	Yasuda et.al., 2002 <sup>19</sup>	7	Idiopathic	55	M	ageusia	5 years	Zinc	FPD, EGM, WMT
			Idiopathic	55	F	hypogeusia sweet, salty, sour	4 months		
			Idiopathic	38	F	hypogeusia sweet dan bitter	1 year		
			Thyroid adenocarcinoma related to radiotherapy	60	F	ageusia	2 years		
			Idiopathic	65	M	hypogeusia sweet	4 months		
			Idiopathic	54	F	hypogeusia sweet dan salty	10 years		
			Zinc deficiency	67	F	hypogeusia sweet	2 years		
7	Heckmann et.al., 2005 <sup>20</sup>	116	Idiopathic 50	41-82	7 M, 43 F	dysgeusia	N/A	Zinc gluconate 140 mg/day	FPD
8	Nin et.al., 2006	321	Idiopathic 125, post common	Mean: 59,9	131 M, 190 F	Taste impairment	N/A	Zinc sulfate, ferrotherapy, herbal	FPD, EGM

			cold 38, drug-induced 62, psychogenic, and iron deficiency					medicine, mild tranquillizer	
9	Sakagami et.al., 2009 <sup>21</sup>	107	Idiopathic, Zinc deficiency	21- 77	51 M, 56 F	N/A	N/A	Polaprezinc, 3 different doses 17 mg, 34 mg, 68 mg for 12 weeks	FPD
10	Takaoka et.al., 2010 <sup>22</sup>	40	Idiopathic 28, Zinc deficiency 12	N/A	N/A	Hypogeusia		Polaprezinc 150 mg, containing 33 mg of zinc, everyday	Subjective symptoms
11	Henkin et.al., 2013 <sup>23</sup>	5183	PIHH 1404, Idiopathic 824, allergic rhinitis 781, head injury 748, other.	1.8- 96	2186 M, 2997 F	Dysgeusia	N/A	N/A	N/A
12	Ikeda et.al., 2013 <sup>24</sup>	219	Idiopathic, Zinc deficiency	N/A	N/A	Taste impairment	N/A	Polaprezinc	FPD
13	Sakaguchi et.al., 2013 <sup>25</sup>	1059	Idiopathic 192, psychogenic 186, medications 179 and others 502	Mean: 60	412 M, 647 F	Taste impairment	N/A	Zinc sulfate, polaprezinc, iron preparation, herbal medicine, and mild tranquillizer	FPD, EGM
14	Ball et.al., 2021 <sup>26</sup>	673	Sinonasal disease 24%, Idiopathic 24%, post-viral olfactory dysfunction 22% others 30%	10- 88	160 M, 510 F, 3 U	Taste impairment	N/A	N/A	N/A
15	Stankevica et.al., 2021 <sup>27</sup>	19	Idiopathic, medications, iatrogenic (post- surgery), radiotherapy, autoimmune disease, mixed	32 - 80	5 M, 14 F	9 Ageusia, 10 Hypogeusia	6 months - 8 years	Zinc, 20 mg/day	FPD, TDT

Notes: M = Male; F=female; U= Unknown; N/A=Not applicable; PIHH= Post influenza-like hyposmia and hypogeusia; EGM= Electrogustometry; FPD= Filter Paper Disc; WMT=Whole-mouth test; TDT=Taste Drop Test

Generally, the methods used to detect taste disorders are the filter paper disk method and electrogustometry, but there are also whole mouth tests (2 articles), taste drop tests (1 article), or only

by applying subjective examination. Aside from laboratory tests, taste-testing can be easily examined on a dental chair using several methods, including the self-reporting questionnaire method,

visual analogue scale (traditional method), and clinical bitterness masking test for phantogeusia.<sup>2,12</sup> The taste testing can also be done using several other ways including whole-mouth test/sip and spit method by gargling using concentrations of sweet, sour, salty and bitter flavours; spatial taste test (tongue mapping) using a cotton swab dipped in a special solution; the filter-paper disk (FPD) method uses filter paper/strips coated with a flavouring material; electrogustometry (EGM) which is a tool to measure the taste threshold by passing an anodal current; edible taste strips using a dried methylcellulose solution, and a flavour discrimination test. All materials used in each method were placed on the tongue and the patient was asked to detect, identify, and evaluate the intensity of taste.

Several studies have reported that one of the effective treatments for patients with idiopathic or persistent taste disorders is zinc. The literature search also showed that almost all idiopathic taste disorders are treated using zinc (9 studies and 1 case report). However, patients should be informed that the results may not be immediate, and it may take several months before any improvement is seen. In one study, administration of zinc gluconate (50 mg 3 times daily) had a positive effect on taste disturbance in zinc-deficient individuals as well as in patients with idiopathic taste loss regardless of the levels of serum zinc.<sup>2,3</sup> Administration of zinc supplements may help in treating taste disorders by increasing the proliferation of normal taste buds, even in patients without zinc deficiency.<sup>2,8</sup>

There is 1 study reported alpha lipoic acid as therapy, 2 studies providing a combination of zinc, iron, herbal medicine, and sedatives, and 2 articles do not mention the medication. A study was done by Femiano et al., (2002) mentioned that this substance is effective for taste disorders.<sup>17</sup> It is an important coenzyme and antioxidant in many cellular pathways in the body and has also been suggested to treat idiopathic dysgeusia. Femiano et al., also found that 91% of patients with idiopathic dysgeusia who took lipoic acid (200 mg every 8 hours) showed some improvement, and 46% had complete resolution. It suggested that  $\alpha$ -lipoic acid may reduce or reverse the neuropathic changes associated with idiopathic dysgeusia.<sup>8,17</sup> Some literature also mentioned some other remedies, including high doses of biotin, glutamate application, supplementation fortified with branched-chain amino acids, thioridazine/haloperidol to inhibit phantogeusia, consuming miracle fruit (*Synsepalum dulcificum*), or by temporary cooling of the oral cavity using the ice cubes.<sup>3</sup> Idiopathic or pathological taste impairment should not be neglected, as it may interfere with patients' general condition and presents several diagnostic difficulties for dentists. As a clinician, dentists should be able to investigate

the taste complaints of every individual, examinations, diagnosis, and their proper management. Zinc preparations are still the first-line treatment for a patient with idiopathic taste disorders.

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