

## Post-tonsillectomy Dysgeusia: A Case Report

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The authors report a case of post-tonsillectomy dysgeusia and discuss the pathogenesis, diagnostics, as well as treatment options done in several reported cases. A 37-year-old man who was diagnosed with recurrent tonsillitis underwent bilateral palatine tonsillectomy, and on the second post-operative day, post-tonsillectomy hemorrhage ensued which required emergency hemostasis at the operating room. Intra-operative findings include active bleeding on the left tongue base, wherein hemostasis was achieved via electrodissection. After the procedure, patient noted a disturbance to taste that persisted for several months. Dysgeusia is an unusual complication of tonsillectomy, occurring in 0.3% to 9% of cases.

**Key words:** Tonsillectomy, complications, taste disorders, dysgeusia, lingual branch of the glossopharyngeal nerve

Tonsillectomy constitutes as one of the oldest surgical procedures in history, dating back to 3000 years ago in Hindu writings.<sup>1</sup> Currently, it is frequently performed and remains as a treatment option for patients who have recurrent tonsillitis.<sup>2-6</sup> Surgical complications occur in as low as 2-4% of all cases, and these may vary from life-threatening complications such as post-operative hemorrhage, to complications that do not threaten directly the life of patients, but may have a considerable impact on quality of life.<sup>3</sup> Post-tonsillectomy dysgeusia is a general description of any distortion of normal taste perception persisting for more than 2 weeks after tonsillectomy, and accounts for 0.3 to 9% of cases.<sup>3,7</sup> Taste sensation is one of the five special sensory functions of man, and aside from providing pleasure during eating, impaired perception of taste may have functional and protective consequences, such as increased risk

for malnutrition, inability to distinguish food toxins as in food poisoning, and disability in personal and occupational endeavors such as domestic or professional cooking.<sup>4</sup> The objectives of this paper were to report a case of post-tonsillectomy dysgeusia and to review the mechanisms that bring about this complication, existing diagnostics, and therapeutic management.

### The Case

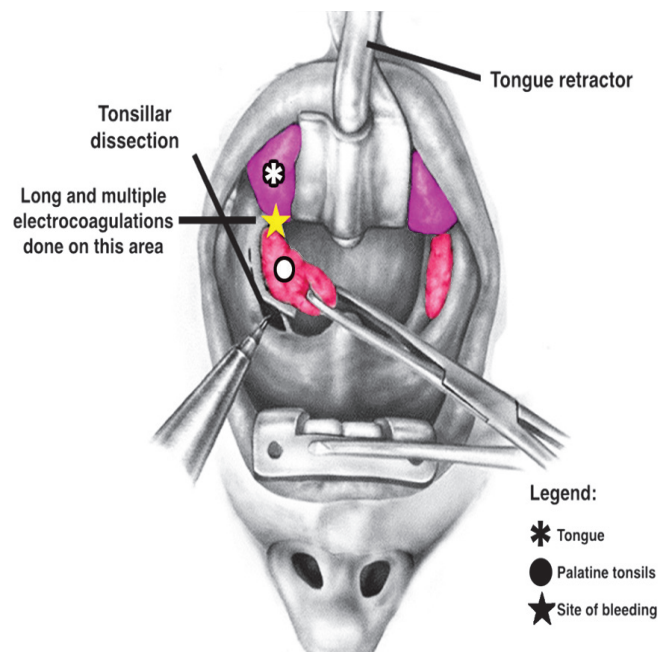
A 37-year-old-man with a chief complaint of throat pain occurring for more than six times in a year for ten years sought consult at the OPD of a tertiary hospital in Quezon City, wherein he was diagnosed with recurrent tonsillitis and was advised to undergo bilateral palatine tonsillectomy. Routine pre-operative clearance work-ups in the institution included complete blood count, blood chemistry, coagulation studies, chest radiography and 12-L electrocardiogram, all of which were unremarkable. Patient was anesthetized via general anesthesia. Intra-operatively, lidocaine with epinephrine (1:100,000 units) was infiltrated bilaterally along the medial border of the palatoglossus muscles, and complete removal of both palatine tonsils was achieved via monopolar and bipolar electrodissection at 30 watts. The procedure lasted for 70 minutes. The following medications were administered while at the operating room: rocuronium 0.6 mg/kg, fentanyl 1 mcg/kg, propofol 1.5 mg/kg, sevoflurane 3 vol% on induction (2-2.5 vol% maintenance), paracetamol 20 mg/kg, dexamethasone 0.1 mg/kg, and clindamycin 300 mg/IV immediately post-op and continued every 6 hours. On the second post-operative

day, the patient experienced sudden profuse intra-oral bleeding with an estimated blood loss of 2000 cc. The patient became tachycardic, hypotensive, disoriented and drowsy. An assessment of post tonsillectomy hemorrhage and Class III hypovolemic shock was made. Two units of whole blood were transfused and the patient was subsequently rushed to the operating room for emergency hemostasis. Intra-operatively, active bleeding was noted at the left tongue base where monopolar and bipolar electrocoagulation was done at 30 watts for over 20 minutes in order to achieve hemostasis (Figure.1). The entire procedure lasted for 30 minutes. The symptoms of shock resolved and the patient continued to improve post-operatively. However, the patient experienced what was thought at the time to be a transient post-tonsillectomy dysgeusia. The dysgeusia however, persisted up to three weeks post-operatively (Clavien-Dindo Classification Grade I). A serum zinc level was normal. The patient underwent clinical evaluation of taste where thermal stimulation and chemical gustation was tested. Thermal stimulation was performed using a size-4 laryngeal mirror soaked in a cup filled with water and ice; the soaked laryngeal mirror was then used to touch the anterior two-thirds and posterior one-third of the tongue, then the hard and soft palate. Chemical gustation was tested using cotton-tipped applicators dipped in the following taste samples: quinine (bitter), dietary vinegar (sour), table salt (salty), and white sugar (sweet). The responses of the patient to both examinations were recorded using the General Labeled Magnitude Scale (Figure 2). Based on this scale, patient barely perceived cold sensation as well as all of the taste samples on the left posterior third of the tongue and left soft palate. Thermal and gustatory testing was repeated monthly. On the ninth post operative month, the patient recovered both thermal and taste perception. The clinical course of the patient suggested that the most probable cause of dysgeusia was an iatrogenic injury to the lingual branch of the left glossopharyngeal nerve (LBGN).

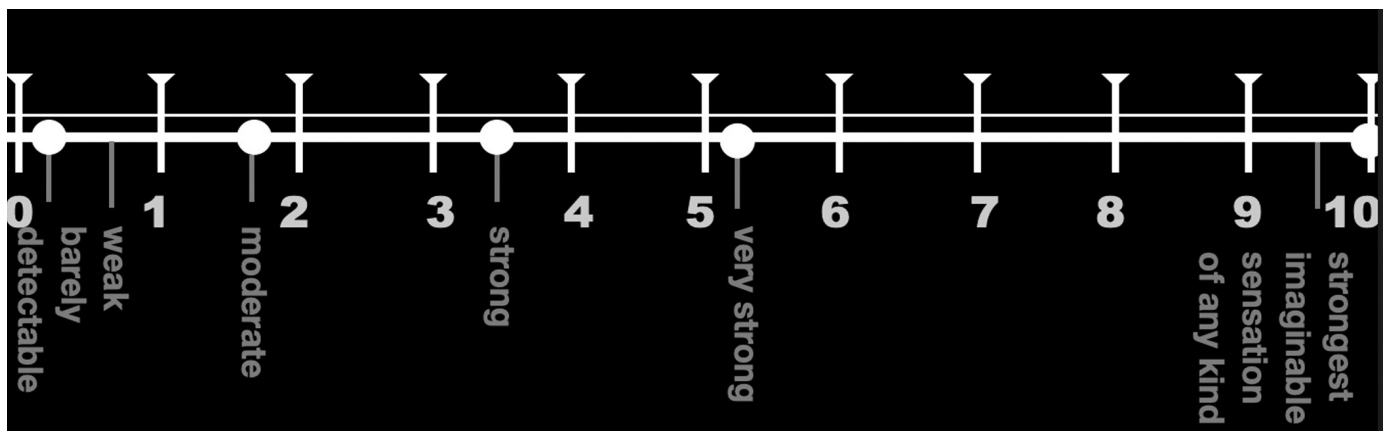
## Discussion

Taste is a special sensation arising in the taste buds and carried by the glossopharyngeal nerve (CN IX), the upper

laryngeal branch of the vagus nerve (CN X), and the chorda tympani branch of the facial nerve (CN VII).<sup>3,4</sup> This special sensation is the result of stimulation not only of the taste buds, but also of the tactile and thermal receptors in the tongue and the olfactory mucosa.<sup>3</sup> Among these nerves, CN IX is considered in the literature as the most important structure in taste function.<sup>3</sup> The lingual branch of the glossopharyngeal nerve (LBGN) mediates taste sensations from the circumvallate papillae and foliate papillae and also provides general sensation to the mucous membranes of the posterior third of the tongue.<sup>5</sup> Dysgeusia is a general description for a disturbance in taste, which is further classified in the literature as to qualitative and quantitative disorders.<sup>6</sup> The qualitative disorders include parageusia, defined as inadequate or wrong taste perception elicited by a stimulus, and phantogeusia, which is the presence of a persistent, unpleasant taste in the absence of any stimulus. The quantitative disorders include ageusia, or a complete loss of the ability to taste, hypogeusia, defined as a partial loss of the ability to taste, and hypergeusia, or enhanced gustatory sensitivity.<sup>6</sup> In this case, the patient



**Figure 1.** Diagram showing the location of the inferior pole of the left palatine tonsil where long and multiple electrocoagulations were done to address the bleeding site in this case.

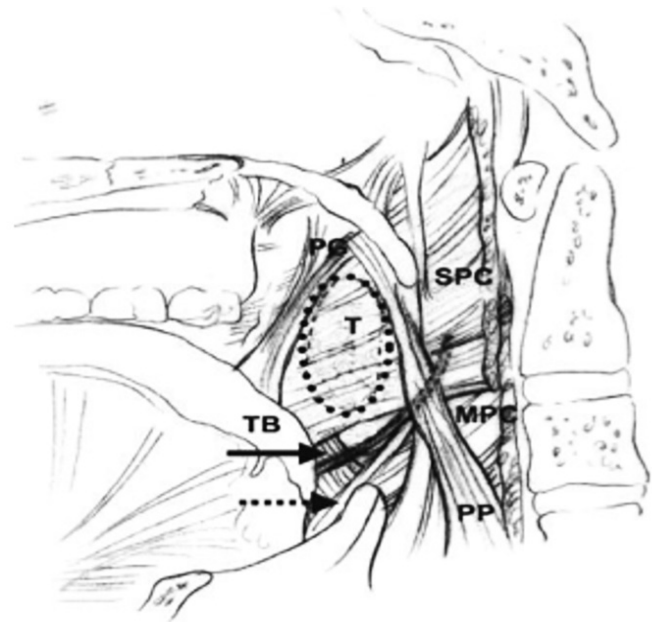


**Figure 2.** General Labeled Magnitude Scale (gLMS) [from Green B, Shaffer GS, Gilmore MM. Derivation and evaluation of a semantic scale of oral sensation magnitude with apparent ratio properties. *Chemical Senses* 1993; 18: 683-702.]

can be classified as having ageusia due to the loss of taste sensation during thermal and gustatory testing.<sup>6</sup> Transient dysgeusia is a common complaint and is defined as a disturbance to taste and is generally present from 4 days to 2 weeks after tonsillectomy.<sup>3</sup> On the other hand, persistent post-tonsillectomy dysgeusia is less frequent with an incidence of 0.3% to 9% of all tonsillectomy cases and may last for 6 months or longer.<sup>3,4,7,11</sup> A diagnosis of post-tonsillectomy dysgeusia can be made through thermal or chemical gustatory testing, which were both employed in the case. Perception of cold stimulus is a general sensory function of CN IX, while perception of different taste stimuli is a special sensory function of CN IX, both of which are carried out through the LBGN. In the case presented, the patient barely perceived cold as well as taste sensation along the left posterior third of the tongue and left soft palate. The LBGN is of particular concern, as several reports mentioned that injury to this nerve during tonsillectomy is among the possible causes of developing post-tonsillectomy dysgeusia.<sup>3,4,7-11</sup> The topographical relationship between the palatine tonsils, the muscular layer of the tonsillar bed, and the LBGN (Figure 3) has been reported in the literature.<sup>7</sup> Anatomic variations of the location of the LBGN through cadaver studies were observed by Ohtsuka, et al. have reported that in 21.5% of 107 tongue sides dissected, the LBGN was directly in contact with the tonsillar capsule. In 55.1%, it was partially protected by muscle fibers from

the stylopharyngeus, palatopharyngeus, and superior pharyngeal constrictor muscles, and that in 23.4%, it passed at a clear distance beneath the styloglossus muscle.<sup>12</sup> It is made clear in their study that anatomical variations exist, and though attempts to locate this nerve during surgery may be done, it should be brought into the attention of the surgeon that possible injury to the LBGN may be committed if surgery comes close to the anatomic variations presented.<sup>12</sup> In fact, a study mentioned that this close anatomic relationship between the palatine tonsil and the LBGN makes the nerve vulnerable during tonsillectomy by the mechanism of direct or indirect thermal injury via electrodissection, as well as direct mechanical injury via attempts to clamp inferior pole vessels.<sup>5</sup> the case presented, the patient underwent multiple electrocoagulations around the left tongue base in an attempt to achieve hemostasis. Several tonsillectomy techniques have been discussed in the literature, such as the cold steel technique, usage of microdebrider, laser-assisted serial tonsillectomy, radiofrequency, coblation tonsillectomy, and electrodissection,<sup>13</sup> however, the latter was the method used in the case for tonsillectomy as well as emergency hemostasis due to institutional availability. According to a 2015 study comparing these various techniques, it was mentioned that persistent post-tonsillectomy dysgeusia was considered a rare late complication of tonsillectomy in general, and there was no mention of any technique that was documented to be

superior in terms of avoiding rare complications such as post-tonsillectomy dysgeusia.<sup>13</sup> The LBGN may also be damaged by the mechanism of stretching and compression by depression of the tongue during oral retraction,<sup>3,9</sup> However, in this patient, there were no attempts to clamp inferior pole vessels nor was there prolonged depression of the tongue. Other proposed causes include lack of dietary zinc and habitual drug intake.<sup>3,4,10</sup> Zinc deficiency is considered as a factor in the development of dysgeusia and it is estimated that 25% of taste and smell disorders in general are caused by zinc deficiency.<sup>10,13</sup> Zinc is an important cofactor for alkaline phosphatase, the most abundant enzyme in taste bud membranes, and is also a component of a parotid salivary protein important to the development and maintenance of normal taste buds.<sup>13</sup> Tissue injury after surgery can lead to serum-tissue zinc redistribution, and increase the demand for zinc due to its participation in blood clotting and wound healing.<sup>13</sup> Catalanotto and Nanda furthered this claim and proposed five possible mechanisms for zinc deficiency leading to taste dysfunction in experimental animals: impaired protein synthesis in taste bud cells, reduced alkaline phosphatase activity in taste buds, abnormality of zinc-containing salivary proteins, blockage of pores in taste buds, and some form of central nervous system dysfunction.<sup>13</sup> The possibility of these mechanisms in the case presented was considered remote because the patient did not appear malnourished and serum zinc level was found to be normal. Habitual intake or prolonged administration of medications may also contribute to the development of dysgeusia.<sup>4</sup> Among the anesthetic agents given in this case, fentanyl was studied in the literature to be similar to drugs known to disturb taste or smell,<sup>4</sup> however, this drug was used under recommended anesthetic dosages and was not considered as a factor in the development of dysgeusia. All patients undergoing tonsillectomy must be informed about the risk of taste impairment, and this is backed up by the study of Windfuhr where it was mentioned that an adequate informed consent is necessary and should explain all complications and questions that may arise in every patient, including complications occurring with a rate of 0.1%, taking into consideration that the incidence rate of post-tonsillectomy dysgeusia previously mentioned which is 0.3% to 9%.<sup>8,9</sup>



**Figure 3.** Anatomy of the right tonsillar fossa. (Solid arrow: lingual branch of the glossopharyngeal nerve, TB: tongue base, Dotted arrow: stylohyoid ligament, T: tonsil, Dashed oval area: tonsillar capsule, PG: palatoglossus muscle, PP: palatopharyngeus muscle, SPC: superior pharyngeal constrictor muscle, MPC: middle pharyngeal constrictor muscle).<sup>7</sup>

In conclusion, taste disturbances after tonsillectomy are rarely described in the medical literature, hence, an understanding of the surgical anatomy as well as anatomical variations of the LBGN cannot be overemphasized. It is very important to stress that trauma to the tonsillar bed, inferior pole electrodissection, clamping of inferior pole vessels, and extensive or prolonged depression of the tongue, should be discouraged in all cases of tonsillectomy. The need to inform patients regarding the risk of this complication is essential to promote informed consent and avoid legal issues. Post-tonsillectomy dysgeusia and its possible impact on the quality of life of patients should be brought into attention of all concerned specialties.

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