Published in final edited form as:

Laryngoscope. 2018 April ; 128(4): 841–846. doi:10.1002/lary.26828.

A Case-Control Evaluation of Fungiform Papillae Density in Burning Mouth Syndrome

Jason M. Naud, DDS¹, Laura Benca, DDS², Mark T. Drangsholt, DDS, MPH, PhD³, Linda LeResche, ScD³, and Susan E. Coldwell, PhD^{3,*}

¹Mayo Clinic Department of Periodontics, Rochester, MN, USA

²Benca and Dean Dentistry, Tukwila, WA, USA

³Departments of Oral Health Sciences and Oral Medicine, University of Washington, Seattle, WA, USA

Abstract

It has been hypothesized that high fungiform papillae density may be a risk factor for developing the taste and pain alterations characteristic of burning mouth syndrome.

Objective—Evaluate whether fungiform papillae density, taste sensitivity, and mechanical pain sensitivity differ between burning mouth syndrome cases and controls.

Study Design—This case-control study compared cases diagnosed with primary burning mouth syndrome with pain-free controls.

Methods—Participants (17 female cases and 23 female controls) rated the intensity of sucrose, sodium chloride, citric acid, and quinine applied separately to each side of the anterior tongue and sampled whole mouth. Mechanical pain sensitivity was assessed separately for each side of the tongue using weighted pins. Digital photographs of participants' tongues were used to count fungiform papillae.

Results—Burning mouth syndrome cases had increased whole mouth taste intensity. Cases also had increased sensitivity to quinine on the anterior tongue, as well as increased mechanical pain sensitivity on the anterior tongue. Fungiform papillae density did not differ significantly between cases and controls. Fungiform papillae density on the left and right sides of the tongue were correlated in controls, however, there was no left/right side correlation in cases.

Conclusion—Cases had increased pain and taste perception on the anterior tongue. The lack of correlation between left and right fungiform papillae density in cases may be an indication of asymmetrical lingual innervation in these patients.

*Corresponding author: Susan E. Coldwell, PhD, Oral Health Sciences, Box 357475, University of Washington Seattle, WA 98195-7475, Phone: 206-616-3087, scoldwel@uw.edu.

The authors declare that they have no conflicts of interest.

Some of these results were previously presented at the American Association for Dental Research annual meeting (March 21 to 24, 2012) in Tampa, FL USA.

LEVEL OF EVIDENCE:

3b: Individual case-control study

Keywords

Head and Neck; Oral cavity; Facial nerve; Pain; Gustation

INTRODUCTION

There is considerable normal variation in fungiform papillae density (FPD), with both genetic and environmental factors contributing to these individual differences.¹ The extent to which this variation impacts sensory function on the tongue is not clear. Since the fungiform papillae contain the taste buds of the anterior tongue, it is logical to assume that those with higher FPD might perceive tastes more intensely. However, while experimental work has confirmed that increasing the number of papillae stimulated by a chemical increases perceived taste intensity of that chemical within an individual (spatial summation), individual differences in perceived taste intensity are not consistently related to differences in FPD.^{1,2}

High fungiform papillae density has been proposed as a risk factor for burning mouth syndrome (BMS),³ an oral pain condition characterized by unexplained burning sensations emanating from the tongue and/or other oral mucosa. It has been suggested that BMS may result from small fiber neuropathy, peripheral nervous system pathology, and/or central nervous system pathology.⁴

One hypothesis is that the burning sensation characteristic of BMS emerges through a central disinhibition process following peripheral nervous system damage to gustatory fibers.^{3,5} Specifically, damage to the chorda tympani (CT) branch of the facial nerve (which carries gustatory signals from the fungiform papillae in the anterior tongue) is proposed to result in central disinhibition, leading to hypersensitivity to trigeminal input. Such hypersensitivity has been observed in patients with unilateral CT transection due to middle ear surgery.⁶ These patients have taste loss on the side of the tongue ipsilateral to the transection, but have relatively enhanced sensitivity to the burn of capsaicin on the side of the tongue contralateral to the transection. Consistent with the idea that damage to gustatory fibers is involved in BMS, electrogustometry has revealed abnormalities in gustatory signaling in the CT of BMS cases compared with controls.⁵ However, the same study failed to find differences in FPD between BMS cases and controls.⁵

Approximately two thirds of BMS patients report taste disturbances in addition to their pain symptoms.⁷ BMS patients regularly present with dysgeusia (phantom tastes). One possible source of taste phantoms is disinhibition of input from the glossopharyngeal nerve (innervating the posterior tongue) following damage to the CT.³

The CT joins the lingual nerve in the infratemporal fossa. From there, it travels with the lingual nerve through the submandibular ganglia to innervate the anterior tongue. Due to their association, damage to the lingual nerve can result in injury to the CT as well. It has been shown that lingual nerve injury, such as that following third molar extraction, results in fungiform papillae atrophy and loss of taste sensation.⁸ Likewise, damage to the CT in ear surgery also results in fungiform papillae atrophy.⁹ If BMS does result from a neuropathic

process of the lingual nerve or the CT, then evidence of fungiform papillae atrophy may be observable in BMS patients.

The current study examined whether FPD differs between BMS patients and pain-free controls. Our work extends a previous investigation of case-control differences in FPD by assessing left-right symmetry.⁵ Additionally, tactile and gustatory sensitivity of the anterior tongue were assessed bilaterally in all participants.

MATERIALS AND METHODS

Participants

All subjects were participants in a larger study that utilized quantitative sensory testing to assess trigeminal function in BMS cases versus pain-free controls. All female participants in the parent study greater than or equal to 33 years of age with clear clinical photographs allowing visualization of the fungiform papillae were included in the analyses presented here. Cases ($n = 17$, mean age 55 years, range 33 to 76 years) were originally recruited through the University of Washington Oral Medicine Clinic and met the following criteria: 1) the treating clinician indicated probable or definite BMS, 2) pain duration was greater than 3 months, with pain on more than the half days in the prior 3 months, 3) the pain was described as persistent or recurrent, 4) the pain was located predominantly in the tongue, 5) other known causes of BMS were ruled out by the clinician. (Oral symptom descriptions from questionnaires completed by each case at study entry are depicted in Table 1.) Controls ($n = 23$, mean age 52 years, range 33 to 68 years) not experiencing oral pain were recruited locally from among a similarly aged population.

Procedures

The University of Washington Human Subjects Review Committee reviewed and approved all study procedures. Written, informed consent was obtained from the participants.

Gustatory Testing—Participants were tested using a protocol based on the NIH Toolbox Regional Taste Intensity Test.¹⁰ Participants were first trained to use a computerized version of the General Labeled Magnitude Scale (gLMS) to rate the intensity of remembered lights and sounds.¹¹ The gLMS is a visual analog scale with labels placed along the line at semi-logarithmic distances determined by magnitude estimation studies.¹² Labels ranged from “No Sensation” at the bottom to “Strongest Imaginable Sensation of Any Kind” at the top. Participants were asked to use the gLMS to rate the intensity of 1 M sucrose (presented first), 1 M NaCl (second), 0.032 M citric acid (third), and 1 mM quinine HCl (fourth). Each taste stimulus was applied with a cotton swab first to the right side and then to the left side of the anterior tongue. Regional testing was followed by whole mouth sip and spit testing using 10 ml each of the same four solutions in the same fixed order. Participants rinsed with filtered water between all taste presentations. Percent of the gLMS scale marked (0 to 100%) was used as the taste intensity rating.

Tongue Photography—Following taste testing, a blue dot was placed to mark the midline of the anterior tongue tip. Two additional blue dots approximately 1 mm in diameter

were then placed bilaterally, equidistant from the midline. Once the blue dots were placed, the participant extended their tongue, an endodontic ruler was placed adjacent to the tongue for scale reference, and digital photographs were taken (Figure 1).

Trigeminal Testing—Participants next participated in a full quantitative sensory testing protocol described in detail elsewhere.¹³ Only the mechanical pain sensitivity (MPS) test (the test most analogous to the suprathreshold taste tests) is described here. MPS was determined using a standardized set of seven custom-made weighted pinprick stimulators designed to produce fixed stimulus intensities of 8, 16, 32, 64, 128, 256, and 512 mN.¹⁴ Pinpricks were applied to the blue dot drawn on each side of the tongue. The right side of the tongue was tested first, followed by the left side. Contact time with the tongue surface was approximately 2 s. Each pinprick was presented five times in a pre-determined, balanced order. Participants rated each stimulus on a 0 to 100 scale. They were instructed to use 0 for “no pain” and 100 for “most intense pain imaginable”. MPS was calculated as the geometric mean of all pain ratings for the seven pinprick stimuli.

Fungiform Papillae Scoring—In preparation for FPD scoring, each participant was randomly assigned a four-digit study code. Photographs were labeled with this four-digit code prior to examination for study purposes. The images were not decoded until after completion of fungiform papillae counts, thus insuring that the examiners were blinded to the case or control status of the participant.

The best representative photograph for each side of the tongue (left/right) was chosen for each participant. Inclusion criteria for selection of photographs were: all three blue dots were present, endodontic ruler was captured in the photograph, the photo contained minimal glare, maximum clarity, and sufficient surface captured. Use of the same photo for both the left and right side was permitted.

Following selection of the photographs, each digital image was loaded into Adobe Photoshop®. Using Photoshop® tools, a line was drawn to mark the tongue midline. The line intersected the blue midline mark and bisected a line connecting the two laterally placed dots. Two 6mm diameter circles were then drawn 3 mm offset from the midline on both the left and right side of the tongue. The circles were aligned posteriorly by the rostral border of the blue dots marking the trigeminal test sites (Figure. 1).

FPD was separately determined for the left and right sides of the anterior tongue using a fungiform papillae counting protocol adapted from the literature.¹⁵ Fungiform papillae were manually counted within the circular regions drawn on the left or right side of each photograph. An anatomical feature was considered a fungiform papilla if it had visible vascularization, bulbous contour, lacked keratin, and was circular in shape. Anatomical features were not counted if the location was outside the placed circles, the feature appeared keratinized, filamentous in shape, lacked vascularization, or if glare impeded visualization. Papilla count was independently determined for each photograph by two examiners.

Analysis—A two (case or control) × four (taste quality) ANOVA was used to analyze whole mouth taste intensity data. A two (case or control) × two (left or right side) × four

(taste quality) ANOVA, followed by Newman-Keuls post hoc tests, was used to analyze taste intensity reports following anterior tongue application. Two (case or control) $\times$ two (left or right side) ANOVA's were used to assess group differences in MPS and FPD.

FPD was calculated by dividing the number of fungiform papillae counted within each 6 mm diameter circle by $(9 \times \pi)$ and then multiplying by 100 to arrive at the number of fungiform papillae per cm^2 . Pearson correlations were used to confirm reproducibility of fungiform papillae counts between the examiners and within one examiner (inter- and intra-rater reliability). For case-control and left-right side analyses, the fungiform papillae counts for both raters were averaged and used to calculate FPD. Pearson correlations were used to assess similarity in FPD on the left and right sides of the tongue.

RESULTS

Photographs of participants in the larger case-control study were eliminated from consideration if they: did not contain all three blue markings on the dorsal surface of the tongue, lacked an endodontic ruler, or the photo quality was poor. The major reason for exclusion was excessive glare. Out of an original sample of 21 cases and 48 controls in the larger study, photographs for 18 cases and 35 controls were found to be acceptable. After elimination of males and those under 33 years of age (the age of the youngest BMS patient), 17 cases and 23 controls remained in the current study. Among these participants, two cases and five controls had usable photographs for one side of the tongue only.

Intra-rater reliability for fungiform papillae counts was excellent ($r=0.90$, $p < 0.0001$), as was inter-rater reliability ($r=0.86$, $p < 0.0001$). FPD (average of left and right side) was 89 ± 5 per cm^2 for cases and 78 ± 7 per cm^2 for controls. While cases tended to have higher counts than controls, this trend did not reach statistical significance. Examination of a scatter plot of FPD reveals that the trend for a difference is largely driven by four controls with very low FPD (< 40) rather than by cases with high FPD (see Figure 2). Cases and controls differed in the correlation between the left and right side FPD. FPD was bilaterally correlated in the controls, $r=0.56$, $p < 0.05$ (Figure 3), but did not correlate in cases, $r=-0.02$ (Figure 4).

Analysis of whole mouth taste intensity data revealed significant differences between cases and controls [$F(1,38) = 4.5$, $p < 0.04$] and between taste qualities [$F(3, 114) = 38.5$, $p < 0.001$], but no group by taste quality interaction. Cases reported higher whole mouth taste intensity than did controls (Figure 5). Analysis of taste intensity data following regional application to the tongue tip revealed significant differences between taste qualities [$F(3,26) = 26.8$, $p < 0.0001$] and an interaction between group (case or control) and taste quality that bordered on statistical significance [$F(3, 114) = 2.6$, $p = 0.05$]. Post hoc Newman-Keuls tests revealed significant differences between cases and controls for quinine, but not other tastes applied to the anterior tongue (Figure 6).

There were significant differences between cases and controls [$F(1, 37) = 7.07$, $p < 0.02$] in MPS (Figure 7), with cases reporting greater pain upon tongue stimulation. Differences

between the left and right side, which may be due to order effects, were also seen in MPS [$F(1, 37) = 8.22, p < 0.01$].

DISCUSSION

In this case-control study, as in a previous investigation by Nasri-Heir and colleagues,⁵ we did not observe a difference in FPD between BMS cases and controls. However, the symmetry of FPD differed in cases and controls. For controls, the FPD on the left and right sides of the tongue were correlated, whereas no appreciable correlation was present in cases. Since fungiform papillae atrophy in the absence of lingual or CT nerve innervation, this difference could be an indication of asymmetrical innervation or damage to the nerve fibers innervating the fungiform papillae in cases. Despite any asymmetry, most (14 of 17) cases experienced their burning mouth pain bilaterally. It is important to note that any damage was not severe enough to cause substantial loss of gustatory or tactile function in the tongue. On the contrary, in our population, increased sensitivity to both taste and pin prick stimulation was observed.

Very low fungiform papillae counts were observed in four controls, but no cases. While high FPD has been suggested to be a risk factor for BMS, the pattern of data observed in this small case-control study does not support that suggestion. Additional studies with larger sample sizes are needed to better assess the true relationship between FPD and BMS. Such studies should examine left and right sides of the tongue separately, as our results indicate that asymmetrical innervation may be a factor in BMS.

The finding that the BMS population in our study exhibited increased sensitivity to taste compared with controls (hypergeusia) is surprising. A number of other studies in the literature have reported decreased sensitivity to taste stimulation on the anterior tongue in BMS patients compared with controls.^{5,16,17} Instead, we observed increased taste sensitivity for quinine on the anterior tongue, as well as for all four taste stimuli when sampled whole mouth. Most of the previous studies have utilized taste threshold measures and/or electrogustometry rather than assessing perceived sensitivity to supra-threshold gustatory stimulation with flavored solutions. It may be that ability to detect low levels of gustatory stimulation and electrical taste is impaired in BMS patients, while perception of more intense gustatory stimulation is sensitized in this population.

Another possible explanation is case selection. All the cases in this study were drawn from a university oral medicine clinic and were given a diagnosis of primary BMS by experienced specialists with considerable expertise in differential diagnosis. Primary BMS is thought to result from either central or peripheral nervous system changes.⁴ Both types of BMS share similar symptoms, and thorough neurological testing is required to distinguish between them. It is possible that our case selection process resulted in inclusion of more central nervous system BMS than have other studies. Neurological testing aimed at distinguishing between BMS originating from peripheral nervous system pathology and central nervous system pathology should be included in future work on this topic.

The FPD determined in this study (89 FP per cm² for cases and 78 FP per cm² for controls) is high compared to the study by Nasri-Heir and colleagues in which they observed an average of just under 28 FP per cm² in cases and 32 FP per cm² in controls.⁵ The Nasri-Heir study assessed a larger portion of the anterior tongue, randomly selecting portions of the dorsal surface of the tongue for scoring, rather than fixing on areas close to the tip as we did.⁵ Since FPD increases from the posterior to the anterior tongue, the selection of a more posterior location would produce lower FPD values in that selected individual. Our use of the same anterior locations for all photos in this study is the likely explanation for the higher FPD we observed. Consistent with this explanation, Fischer and colleagues observed an average of 103.5 FP per cm² in their population when counting from a single site on the tongue tip anterior to the regions used for counting in this study.¹

CONCLUSION

Increased sensitivity to both pin prick and taste stimulation were observed in BMS cases compared with controls. However, compared with controls, cases did not have markedly increased FPD. Thus, differences in FPD likely do not account for the difference in sensitivity to sensory stimulation. Unexpectedly, cases exhibited asymmetry in FPD between the right and left sides of the tongue. Further work is needed to assess whether the observed asymmetry is related to BMS etiology.

Acknowledgments

This work was conducted at the University of Washington and supported by federal funds from the National Institute of Dental and Craniofacial Research, 3R21DE018768-02S1 (PI, Mark Drangsholt), T32 DE07132 (PI, Timothy DeRouen), by UL1 RR025016 and UL1TR000423 from the NIH National Center for Research Resources, and the Washington Dental Service Professorship (Susan Coldwell).

The authors would like to thank Kathy Scott, Kimberly Huggins, and Mary Kay Hagstrom, Julia Newmiller and Dr. Amelia Chim for their assistance with this study. This work was supported by federal funds from the National Institute of Dental and Craniofacial Research, 3R21DE018768-02S1 (PI, Mark Drangsholt), T32 DE07132 (PI, Timothy DeRouen), by UL1 RR025016 and UL1TR000423 from the NIH National Center for Research Resources, and the Washington Dental Service Professorship.

References

1. Fischer ME, Cruickshanks KJ, Schubert CR, Pinto A, Klein R, Pankratz JS, Huang GH. Factors related to fungiform papillae density: the beaver dam offspring study. *Chem Senses*. 2013; 38:669–677. [PubMed: 23821729]
2. Delwiche JF, Buletic Z, Breslin PA. Relationship of papillae number to bitter intensity of quinine and PROP within and between individuals. *Physiol Behav*. 2001 Oct.74:329–37. [PubMed: 11714496]
3. Grushka M, Bartoshuk LM. Burning mouth syndrome and oral dysesthesias. *The Canadian Journal of Diagnosis*. 2000 Jun.:99–109.
4. Jääskeläinen SK. Pathophysiology of primary burning mouth syndrome. *Clin Neurophysiol*. 2012; 123:71–77. [PubMed: 22030140]
5. Nasri-Heir C, Gomes J, Heir GM, Ananthan S, Benoliel R, Teich S, Eliav E. The role of sensory input of the chorda tympani nerve and the number of fungiform papillae in burning mouth syndrome. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod*. 2011; 112:65–72. [PubMed: 21601494]

6. Schöbel N, Kyereme J, Minovi A, Dazert S, Bartoshuk L, Hatt H. Sweet taste and chorda tympani transection after capsaicin-induced lingual pain perception in adult human subjects. *Physiol Behav.* 2012; 107:368–373. [PubMed: 22995977]
7. Formaker BK, Frank ME. Taste function in patients with oral burning. *Chem Senses.* 2000; 25:575–81. [PubMed: 11015329]
8. Zuniga JR, Chen N, Miller IJ. Effects of chorda-lingual nerve injury and repair on human taste. *Chem Senses.* 1994 Dec.19:657–65. [PubMed: 7735845]
9. Just T, Pau HW, Witt M, Hummel T. Contact endoscopic comparison of human fungiform papillae of healthy subjects and patients with transected chorda tympani nerve. *Laryngoscope.* 2006; 116:1216–1222. [PubMed: 16826063]
10. Coldwell SE, Mennella JA, Duffy VB, et al. Gustation assessment using the NIH Toolbox. *Neurology.* 2013; 80(Supplement 3):S20–S24.
11. Rawal S, Bartoshuk LM, Coldwell SE, et al. NIH Toolbox: proposed assessment of taste function and phenotype. *Chem Senses.* 2010; 35:A18.
12. Bartoshuk LM, Duffy VB, Green BG, et al. Valid across-group comparisons with labeled scales: the gLMS versus magnitude matching. *Physiol Behav.* 2004; 82:109–114. [PubMed: 15234598]
13. Pigg M, Baad-Hansen L, Svensson P, Drangsholt M, List T. Reliability of intraoral quantitative sensory testing (QST). *Pain.* 2010; 148:220–226. [PubMed: 20022428]
14. Rolke R, Baron R, Maier C, et al. Quantitative sensory testing in the German Research Network on Neuropathic Pain (DFNS): standardized protocol and reference values. *Pain.* 2006 Aug.123:231–243. [PubMed: 16697110]
15. Shahbake M, Hutchinson I, Laing D, Jinks A. Rapid quantitative assessment of fungiform papillae density in the human tongue. *Brain Research.* 2005; 1052:196–201. [PubMed: 16051197]
16. Imura H, Shimada M, Yamazaki Y, Sugimoto K. Characteristic changes of saliva and taste in burning mouth syndrome patients. *J Oral Pahol Med.* 2016; 45:231–236.
17. Braud A, Descroix V, Ungeheuer MN, Rougeot C, Boucher Y. Taste function assessed by electrogustometry in burning mouth syndrome: a case-control study. *Oral Dis.* 2017; 23:395–402. [PubMed: 28029722]

Figure 1.

Digital image of the tongue with a 6mm diameter circular border offset 3mm to the right of the midline with the rostral position limited by the posterior border of a lateral dot applied for Mechanical Pain Sensitivity testing. Fungiform papillae in the area enclosed by this circle were counted.

Figure 2. Fungiform papillae number per square cm is depicted for cases (left column) and controls (right column). Each marker depicts the density for one study participant.

Figure 3.

Left-Right Fungiform Papillae Density Correlation in Controls

Left side fungiform papillae density (as fungiform papillae number per square cm) is plotted on the x-axis and compared with right side fungiform papillae density plotted on the y-axis.

The trend line depicts a linear fit of the data.

Figure 4.

Left-Right Fungiform Papillae Density Correlation in Cases

Left side fungiform papillae density (as fungiform papillae number per square cm) is plotted on the x-axis and compared with right side fungiform papillae density plotted on the y-axis. The trend line depicts a linear fit of the data.

Figure 5.

Whole-mouth taste intensity ratings reported using the General Labeled Magnitude Scale are depicted for cases (hashed bars) and controls (solid bars). Data are depicted for responses to tasting 10 ml each of solutions of 1 M sucrose, 1 M sodium chloride, 0.032 M citric acid, and 1 mM quinine. Whiskers indicate standard error of the mean.

Figure 6.

Anterior tongue taste intensity ratings reported using the General Labeled Magnitude Scale are depicted for cases (hashed bars) and controls (solid bars). Data are depicted for taste intensity responses following application of taste solutions to the anterior tongue with a cotton swab. Solutions were 1 M sucrose, 1 M sodium chloride, 0.032 M citric acid, and 1 mM quinine. Whiskers indicate standard error of the mean.

Figure 7.

Pain ratings (geometric mean) from pin prick testing on the anterior tongue are depicted for the Mechanical Pain Sensitivity (MPS) testing. Data from the left side of the tongue and right side of the tongue are presented separately. Data from cases are depicted in the hashed bars. Data from controls are depicted in the solid bars. Whiskers indicate standard error of the mean.

Oral Symptoms of Burning Mouth Syndrome Cases

Table 1. Oral symptom descriptions based on questionnaire data collected from each case at the time of study enrollment are presented in Table 1.

Table 1

	Mouth Pain Location	Painful side*	Hours of pain per day	Days in pain past 3 months	Worst pain (1–10) past 3 months	Average pain (1–10) past 3 months	Time since symptoms began	Phantom Taste
1	Tongue	L&R	16+	180	7	5	3+ years	Yes
2	Tongue, upper teeth	L&R	16+	80	10	5	1.5 years	Yes
3	Tongue, bony ridges	L&R	9–16	180	8	4	3 years	No
4	Tongue	Left only	16+	90	9	7	9 months	Yes
5	Tongue, lower teeth	L&R	16+	90	8	8	25 years	No
6	Tongue, gum	Right only	4–8	180	8	6	8 years	No
7	Tongue, gum, teeth	L&R	16+	90	5	4	3 years	No
8	Tongue	L&R	1–3	90	3	2	4 years	No
9	Tongue	L&R	1–3	90	5	5	9 months	No
10	Tongue	L&R	9–16	180	10	5	4 years	No
11	Tongue	L&R	9–16	180	9	7	2 years	No
12	Tongue, gum	Left only	9–16	180	8	6	1.5 years	No
13	Tongue, lips, palate	L&R	4–8	180	7	5	4 months	Yes
14	Tongue	L&R	16+	180	5	3	1 year	No
15	Tongue	L&R	9–16	90	8	7	1.5 years	Yes
16	Tongue, upper teeth	L&R	4–8	175	7	5	3–4 years	Yes
17	Tongue	L&R	9–16	90	7	5	7 months	Yes

* L&R signifies that the pain is on both the left and right sides.