Study of the prevalence of lingual foramina at the anterior region of the mandible: an evaluation using cone-bean computerized tomography

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Abstract

At the anterior region of the mandible we can find the foramina located in the lingual cortical lateral to the mental spine and those located in the median line.

The aim of the present study was to investigate and evaluate the prevalence, presence, number, position, length, diameter and distribution of lingual foramina (LF) and its corresponding vascular channels in the anterior region of the mandible.

The sample consisted of 303 CBCTs from January to October 2015 and analyzed by a single examiner in 2018.

The prevalence rate found in this study was 99.3% (301). From the 103 tomographies belonging to men, in 102 (99.0%), foramina were observed. In the 200 tomographies obtained from women, in 199 (99.5%) the presence of foramina was observed.

Background and Aim

At the anterior region of the mandible we can find the foramina located in the lingual cortical lateral to the mental spine and those located in the median line. There are an average of 1 to 5 foramina, where the branches of the sublingual artery are observed, and special attention is given to these lingual foramina (LF) channels at the moment of implant surgery at this region, avoiding immediate post surgery vascular accidents.

The aim of the present study was to investigate and evaluate the prevalence, presence, number, position, length, diameter and distribution of LF and its corresponding vascular channels in the anterior region of the mandible.

Methods and Materials

The sample consisted of 303 CBCTs from January to October 2015 and analyzed by a single examiner in 2018.

The anterior mandible area in the symphysis region was evaluated, analyzing the presence, number, position, distances, length, diameter, and distribution of the lingual foramina and its corresponding lingual vascular canals (LVC) from the base of the mandible.

The CT scanner used to obtain the images was the I-CAT® Next Generation (Imaging Sciences International, Hatfield, PA, USA). The images were analyzed using i-CAT XoranCat® software (Imaging Sciences International, Hatfield, Pennsylvania, USA), with 1mm thick transaxial images and 1mm intervals.

Initially, some data were analyzed, such as gender, age, whether the patient was edentulous or not, presence of canals (yes or no), and number of canals (nonexistent, 01 channel, 2 channels, 03 channels or more). Then, measurements of the beginning (M1) and end (M2) distances of the channels found in relation to the base of the mandible and distance from the end of the canal to the cortical wall (M3) were analyzed.

Fig 1: Transaxial section of lower central incisor region showing LF and its measurements

Results

The prevalence rate found in this study was 99.3% (301).

The most prevalent number of channels in CBCTs was two (47.5%), followed by the presence of a single channel (46.5%). The existence of three channels was found in only 6.0% of cases.

The presence of foramina was not significantly associated with gender ($p=1.000$), age ($p=0.081$) and whether the individual was dentate or edentulous ($p=1.000$) (Table 1). Comparing the distance from the beginning of the canal to the base of the mandible, there was a significant difference between men and women only in the lower canal ($p=0.013$), being higher in males.

Independent variable	Foramina		Total	p value
	Presente	Absent		
Gender				
Male	102 (99,0%)	1 (1,0%)	103 (34,0%)	1,000
Female	199 (99,5%)	1 (0,5%)	200 (66,0%)	
Total	301 (99,3%)	2 (0,7%)	303 (100,0%)	
Age				
≥ 30 years	34 (100,0%)	0 (0,0%)	34 (11,2%)	0,081
31-60 years	182 (100,0%)	0 (0,0%)	182 (60,1%)	
≥ 61 years	85 (97,7%)	2 (0,3%)	87 (28,7%)	
Total	301 (99,3%)	2 (0,7%)	303 (100,0%)	
Dental condition				
Dentate	281 (99,3%)	2 (0,7%)	283 (93,4%)	1,000
Edentulous	20 (100,0%)	0 (0,0%)	20 (6,6%)	
Total	301 (99,3%)	2 (0,7%)	303 (100,0%)	

Tab 1: Absolute (n) and relative (%) frequencies of lingual foramina according to gender, age and dental condition

Conclusion

The prevalence of lingual foramina observed in this study was 99.3% without significant differences in gender, age or dental condition.

The data found in this study are particularly interesting to help clinicians to safely perform surgical procedures in the anterior region of the mandible. CBCT is an important mean of preoperative planning, helping to identify anatomical structures and their characteristics in the anterior region of the mandible.

References

- 1 - Abesi F, Ehsani M, Haghanifar S, Sohanian S. Assessing the anatomical variations of lingual foreman and its bony canals with CBTC. Int J Sci: Basic Appli Res. 2015;20(1):220-27.
- 2 - He P, Truong MK, Adeeb N, Tubbs RS, Iwanaga J. Clinical anatomy and surgical significance of the lingual foramina and their canals. Clin Anat. 2017 Mar;30(2): 194-204.