

FREQUENCY OF MANDIBULAR MEDIAL LINGUAL, LATERAL LINGUAL AND BUCCAL FORAMENS ACCORDING TO GENDER

MANDİBULAR MEDİAL LİNGUAL, LATERAL LİNGUAL VE BUKKAL FORAMENLERİN CİNSİYETE BAĞLI SIKLIĞI

Doç. Dr. Binali ÇAKUR*

Yrd. Doç. Dr. Muhammed Akif SÜMBÜLLÜ*

Yrd. Doç. Dr. Fatma ÇAĞLAYAN*

Yrd. Doç. Dr. Oğuzhan ALTUN**

Prof. Dr. Hayati Murat AKGÜL*

Makale Kodu/Article code: 1175
Makale Gönderilme tarihi: 17.05.2013
Kabul Tarihi: 02.10.2013

ABSTRACT

Purpose: The aim of this study was to assess the frequency of mandibular medial lingual, lateral lingual and buccal foramens located on the both lingual and buccal side of mandible according to gender by dental volumetric tomography.

Material and method: Dental volumetric tomography images of 190 consecutive patients were examined retrospectively. The frequency of mandibular medial lingual, lateral lingual and buccal foramens were evaluated with respect to gender.

Results: Statistically significant differences could not be found in the frequency of mandibular median lingual, mandibular lateral lingual and mandibular buccal foramina according to gender. However, the frequency of mandibular lateral lingual foramina was higher in female; the frequency of mandibular buccal foramina was higher in male.

Conclusions: Dental volumetric tomography can easily demonstrates presence and location of these foraminas. Maxillofacial radiologists and surgeons should be aware of these canals and their importance in order to prevent complications during implant planning and other surgical procedures.

Key words: mandibular foramen, dental volumetric tomography, accessory foramen, mandible

ÖZET

Amaç: Bu çalışmanın amacı mandibular medial lingual, lateral lingual ve bukkal foramenlerin cinsiyete bağlı olarak dental volumetrik tomografi ile değerlendirmektir.

Gereç ve yöntem: 190 hastanın dental volumetrik tomografi kayıtları retrospektif olarak incelendi. Medial lingual, lateral lingual ve bukkal foramenlerin sıklığı cinsiyete bağlı olarak değerlendirildi.

Bulgular: İstatistiksel olarak cinsiyete göre medial lingual, lateral lingual ve bukkal foramenlerin sıklığında anlamlı farklılık bulunamadı. Ancak, mandibular lateral lingual forameninin sıklığı kadınlarda daha yüksekti; mandibular bukkal foremenin sıklığı ise erkeklerde daha yüksekti.

Sonuç: Dental volumetrik tomografi bu foramenlerin varlığını ve lokalizasyonunu kolaylıkla gösterebilir. Maksillofasial radyolojistler ve cerrahlar implant planlaması ve diğer cerrahi işlemler öncesinde doğabilecek komplikasyonları önlemek için bu kanalların farkında olmalıdırlar.

Anahtar kelimeler: mandibular foramen, dental volumetrik tomografi, aksesuar foramen, mandibula

INTRODUCTION

The mandible has many unnamed accessory foramina, especially on the medial side, on or near the genial tubercle (lingual foramina)¹⁻⁴. They are very variable in their distribution¹ and are located more

frequently in the symphyseal region of the mandibular body^{2,3,5}. However accessory foramina located laterally to genial tubercle have been reported^{3,6,7}. On the medial side of the mandible, these foramina are divided into medial and lateral foramina^{3,8,9}. However, they have also been observed in the retromolar

*Department of Oral Diagnosis and Radiology, Faculty of Dentistry, Ataturk University, Erzurum, Turkey

**Department of Oral Diagnosis and Radiology, Faculty of Dentistry, İnönü University, Malatya, Turkey



area^{1,2,10}. Although the accessory foramina are present more often on the medial side of the mandible^{2,5,10}, they are also observed on its lateral one (buccal foramina)². These foramina may be of significance in relation to the effectiveness of local anesthesia^{3,6,7}, causing complications during dental procedures^{1,3,6,8,9}, the metastasis of tumors^{3,11-14}.

The aim of this study was to assess the frequency of mandibular accessory foramina (MMLF, MLLF and MBF) located on the both lingual and buccal side of mandible according to gender by DVT.

MATERIALS AND METHODS

We designed a retrospective study consisting of DVT images of 190 patients (104 female and 86 male) who visited our clinic between January 2011 and June 2012. Their ages ranged from 10 to 74 years, with mean ages of 32.9 years \pm 17.2 years. DVT scanning (Newtom FP, Quantitative Radiology, S.R.L. Verona, Italy) was performed on patients who were resting in supine position. Positioning of the patient's heads was performed using two light-beam markers. The vertical positioning light was aligned with the patient's mid-sagittal lines, which helped to keep the head centered with respect to the rotational axis. The lateral positioning light was centered at the level the mandibular corpus, indicating the optimized center of the reconstruction area. In addition, the head position was adjusted in such a way that the mandibular basis was perpendicular to the floor. DVT scans with 0,5mm axial slices, 1mm coronal slices and 1 mm crosssectional slices were obtained. Imaging parameters were kV; 110, mA; 10 and FOV; 130mm. The output was automatically adjusted during a 360° rotation according to tissue density (automatic exposure control system). DVT images evaluated using DVT software (Quantitative Radiology, NNT-software version 3.1, Verona, Italy) with respect to presence of accessory foramina on the both lingual and buccal side of the mandible (Figures 1-3). Images were viewed in a darkened room on 2 computers with 21.3-inch flat-panel color- active matrix thin-film transistor medical display (Nio Color 3MP, Barco, Belgium) with a resolution of 2048x1536 pixels at 76 Hz and 0.2115-mm dot pitch operated at 10 bits.



Figure 1. MMLF (arrow) showing on the crosssection section.

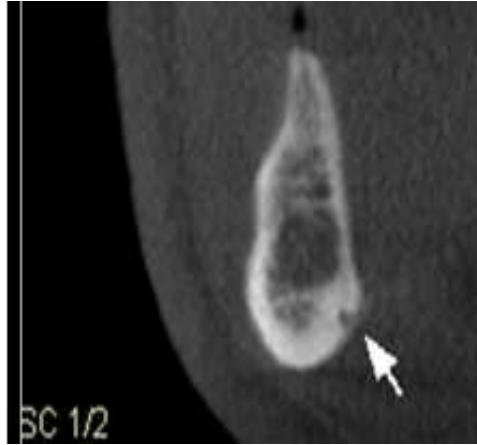


Figure 2. MLLF (arrow) showing on the crosssection section.



Figure 3. MBF (arrow) showing on the crosssection section.

Statistical analyses

Statistical analyses were conducted with the program SPSS (SPSS 20.0; Inc, Chicago, IL, USA). The differences between gender were evaluated using chi-square statistics. Differences were considered significant at p less than .05.

RESULTS

Statistically significant differences could not be found in the frequency of MMLF, MLLF and MBF according to gender (Tables 1). However, in female the frequency of MLLF was higher and in male the frequency of MBF was higher.

Tablo 1. The frequencies of MMLF, MLLF and MBF according to gender.

	Kadın		Erkek		χ^2	P
	n	%	n	%		
Mandibular Median Lingual Foramina (MMLF)	104	100	86	100	4.187	0.123
Mandibular Lateral Lingual Foramina (MLLF)	54	51.9	28	39.5.8	0.179	0.278
Mandibular Buccal foramina (MBF)	14	13.5	16	57.1	2.449	0.118

DISCUSSION

In the literature, the frequency of accessory foramina differs because of the number of investigating mandibles, the methods, criteria applied and sample size². It is reported that accessory foramina are seen in nearly all investigated mandibles in studies to determine the topography of accessory foramina by using DVT¹⁵⁻¹⁸. In our study, the only MMLF was seen in all patients. Chapnick¹⁹ reported that the incidence rate of accessory foramina was 68.9%. Przysatńska and Bruska² investigated macroscopically a total of 397 human mandibles, (299 adult, 18 infantile, and 80 fetal) for the frequency, position, and diameter of accessory foramina. They reported that in 96% of investigated adult mandibles, at least one accessory foramen was seen.

In the literature, there are many studies regarding location, distribution, and diameter of accessory foramina^{2,15-18}. A number of studies have

reported that accessory foramina are located with highest incidence rate on the internal aspect of the mandible^{2,5,10}, than on its external one. Our results also confirm this finding. In our study, accessory foramina were observed mostly in the internal surface of the mandible. In this study, statistically significant differences could not be found in the frequency of MMLF, MLLF and MBF according to gender. However, the frequency of MLLF was higher in female; the frequency of MBF was higher in male.

In conclusion, maxillofacial radiologists and surgeons should be aware the frequencies of these foramina between gender and of their importance in order to prevent complications during the pre-surgical planning and other surgical procedures.

REFERENCES

1. McDonnell D, Reza Nouri M, Todd ME. The mandibular lingual foramen: a consistent arterial foramen in the middle of the mandible. J Anat 1994;184:363-9.
2. Przysatńska A, Bruska M. Anatomical classification of accessory foramina in human mandibles of adults, infants, and fetuses. Anat Sci Int 2012;87:141-9.
3. Przysatńska A, Bruska M. Foramina on the internal aspect of the alveolar part of the mandible. Folia Morphol (Warsz). 2005;6:89-91.
4. Nagar M, Bhardwaj R, Prakash R. Accessory lingual foramen in adult indian mandibles. J Anat Soc 2001;50:13-4.
5. Fanibunda K, Matthews JN. Relationship between accessory foramina and tumour spread in the lateral mandibular surface. J Anat 1999;195:185-90.
6. Jeyaseelan N, Sharma JK. Morphological stud of unnamed foramina in north Indian human mandibles and its possible role in neurovascular transmission. Int J Oral Surg 1984;13: 239-42.
7. Madeira MC, Percinoto C, das Gracas M, Silva M. Clinical significance of supplementary innervation of the lower incisor teeth: A dissection study of the mylohyoid nerve. Oral Surg Oral Med Oral Pathol 1978;46:608-14.



8. Eriguchi K. Vorläufige Mitteilung über die Bedeutung der Löcher an der Lingualfläche des Unterkieferkörpers. Yokohama Med Bull 1954; 5:442-5.
9. Shirai M. Beitrag zur Kenntnis der Bedeutung der Löcher an der Lingualfläche des Unterkieferkörpers. Yokohama Med Bull 1960;11: 541-9.
10. Ossenberg NS. Retromolar foramen of the human mandible. Am J Phys Anthropol 1987; 73:119-28.
11. Barttelbort SN, Bahn SL, Ariyan S. Rim mandibulectomy for cancer of the oral cavity. Am J Surg 1987;154: 423-8.
12. Doig TN. Possible routes of spread of carcinoma of the maxillary sinus to the oral cavity. Clin Anat 1998;11:149-56.
13. Fanibunda K, Matthews JN. The relationship between accessory foramina and tumour spread on the medial mandibular surface. J Anat 2000;196: 23-9.
14. McGregor JA, MacDonald DG. Routes of entry of squamous cell carcinoma into the mandible. Head Neck Surg 1988;10: 294-301.
15. Katakami K, Mishima A, Kuribayashi A, Shimoda S, Hamada Y, Kobayashi K. Anatomical characteristics of the mandibular lingual foramina observed on limited cone-beam CT images. Clin Oral Impl Res 2009;20:386-90.
16. Kawai T, Asaumi R, Sato I, Yoshida S, Yosue T. Classification of the lingual foramina and their bony canals in the median region of the mandible; cone beam computed tomography observation of dry human mandibles. Oral Radiol 2009;23:42-8.
17. Liang X, Jacobs R, Lambrichts I. An assessment on spiral CT scan of the superior and inferior genial spinal foramina and canals. Surg Radiol Anat 2006;28:98-104.
18. Yoshida S, Kawai T, Okutsu K, Yosue T, Takamari H, Surohara M, Sato I. The appearance of foramen in the internal aspect of mental region of mandible from Japanese cadavers and dry skulls under macroscopic observations and three dimensional CT images. Okajimas Folia Anat Jpn 2005;82:83-8.
19. Chapnick L. A foramen on the lingual of the mandible. J Canad Dent Assn 1980;7:444-5.

Yazışma Adresi:

Doç. Dr. Binali ÇAKUR
Atatürk Üniversitesi
Diş Hekimliği Fakültesi
Oral Diagnoz ve Radyoloji Anabilim Dalı
25240 Erzurum / TÜRKİYE
Telf.: +90.442.231 1765
Faksı: +90.442.2360945
E-mail: bcakur@atauni.edu.tr

