STUDY OF THE LINGULA IN DRY HUMAN MANDIBLES AND ITS CLINICAL SIGNIFICANCE

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ABSTRACT

Introduction: On medial aspect of ramus of mandible, there is small tongue like bony projection located near the margin of mandibular foramina called lingula. It lies close proximity to mandibular foramina, which transmits the inferior alveolar nerve and the corresponding artery to the mandibular canal. Bony derivatives of first brachial arch (Meckel's cartilage) are the spine of sphenoid, malleus, incus and the part of the mandible bearing the lingula.

Materials and Methods: Present study has been carried out on Ninety (180 sides) dry human mandibles of north gujarat population in the anatomy department of various medical college of north gujarat. Height and distance of lingula from various bony landmark of mandible were noted by measuring the following distances using vernier calipers. The mean and standard deviation (S.D) of each measurement was calculated using Microsoft excel.

Result: We noted four different types of shape - triangular, truncated, nodular and assimilated. Truncated lingula (42.22%) was most prevalent than Nodular (21.67%), Assimilated (20.56%), Triangular (15.55%) shapes. Average height (Mean $\pm$ SD) of the lingula was 7.75 ± 1.81 mm on both sides. Average distance of lingular tip to anterior and posterior border of ramus of mandible were 16.62 ± 3.31 mm and 15.94 ± 1.63 mm. Average distance of lingula from mandibular notch and base of mandible were 16.05 ± 2.85 mm and 34.16 ± 2.96 mm.

Conclusion: Present study's findings may be helpful for dental surgeons to locate the lingula and important structures nearby while doing surgical procedures to avoid its damage.

KEY WORDS: Lingual, Mandible, Morphology.

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Access this Article online	Journal Information
Quick Response code DOI: 10.16965/ijar.2018.160	International Journal of Anatomy and Research ICV for 2016 90.30 ISSN (E) 2321-4287 ISSN (P) 2321-8967 https://www.ijmhr.org/ijar.htm DOI-Prefix: https://dx.doi.org/10.16965/ijar
	Article Information
	Received: 22 Feb 2018 Peer Review: 22 Feb 2018 Revised: None
	Accepted: 05 Apr 2018 Published (O): 05 May 2018 Published (P): 05 May 2018

INTRODUCTION

Latin meaning of lingula is lingula mandibulae. On medial aspect of ramus of mandible, there is small tongue like bony projection located near the margin of mandibular foramina [1]. Lingula means “mandibular tongue” was described by Johannes-Baptist Spix (German anatomist) in 1815, so it was also named as Spix's ossicle or spine [2]. It lies close proximity to mandibular

foramina, which transmits the inferior alveolar nerve and the corresponding artery to the mandibular canal [3]. It acts as important bony landmark for giving injection of local anaesthetics agent in dental surgery or for excision of nerve for facial neuralgia [4]. Bony derivatives of first brachial arch (Meckel's cartilage) are the spine of sphenoid, malleus, incus and the part of the mandible bearing the

lingula. Sphenomandibular ligament and anterior ligament of malleus are the embryological remnant of first arch. Lingula provide attachment to sphenomandibular ligament [5]. Because of close relation to neurovascular bundle, present study is conducted to observe the different shapes of lingula and its distance from various bony landmark of mandibles of north Gujarat population and its clinical significance.

MATERIALS AND METHODS

The present study has been carried out on Ninety (180 sides) dry human mandibles of north Gujarat population in the anatomy department of various medical college of north Gujarat. The measurements were taken with the help of the Vernier caliper. We noted four different types of shape - triangular shaped lingula [Figure 1], truncated shaped lingula [Figure 2], nodular shaped lingula [Figure 3] and assimilated shaped lingula [Figure 4]. The height and distance of lingula from various bony landmark of mandible were noted by measuring the following distances using vernier calipers. The mean and standard deviation (S.D) of each measurement was calculated using Microsoft excel.

Fig. 1: Triangular Lingula. **Fig. 2:** Truncated Lingula.

Table 2: Height of lingula and its distance from various bony landmark of mandible.

Sr. No.	Measurements	Right side	Left side	Average (both side)
		Mean (mm) $\pm$ S.D (mm)	Mean (mm) $\pm$ S.D (mm)	Mean (mm) $\pm$ S.D (mm)
1	Height	7.88 $\pm$ 1.32	7.61 $\pm$ 2.30	7.75 $\pm$ 1.81
2	Distance from anterior border of the ramus	17.3 $\pm$ 2.15	15.94 $\pm$ 4.47	16.62 $\pm$ 3.31
3	Distance from posterior border of the ramus	15.88 $\pm$ 1.43	16.01 $\pm$ 1.83	15.94 $\pm$ 1.63
4	Distance from mandibular notch	16.2 $\pm$ 2.32	15.9 $\pm$ 3.37	16.05 $\pm$ 2.85
5	Distance from base of mandible	34.34 $\pm$ 2.95	33.99 $\pm$ 2.97	34.16 $\pm$ 2.96

Fig. 3: Nodular Lingula. **Fig. 4:** Assimilated Lingula.

RESULTS

In our study, We observed that, Truncated lingula (42.22%) was most prevalent than Nodular (21.67%), Assimilated (20.56%), Triangular (15.55%) shapes. 55.55% of total mandibles we observed have bilaterally symmetry and 45.55% mandibles were showing different shape of lingula in both side [Table 1].

In present study, the average height (Mean $\pm$ SD) of the lingula was 7.75 $\pm$ 1.81 mm on both sides. Average distance of lingular tip to anterior and posterior border of ramus of mandible were 16.62 $\pm$ 3.31 mm and 15.94 $\pm$ 1.63 mm. Average distance of lingula from mandibular notch and base of mandible were 16.05 $\pm$ 2.85 mm and 34.16 $\pm$ 2.96 mm. Mean and S.D. of various parameter of right and left sides of mandible were summarized below [Table 2].

Table 1: Different Shape of lingual.

Sr. No.	Shapes	Bilateral	Unilateral		Percentage (%)
			Right	Left	
1	Truncated	23	20	10	42.22
2	Triangular	8	4	8	15.55
3	Nodular	10	10	9	21.67
4	Assimilated	9	6	13	20.56

DISCUSSION

Table 3: Comparison of various studies regarding shapes of lingual.

Author	Sample Size	Triangular(%)	Nodular (%)	Truncated (%)	Assimilated (%)
Tuli et al[1]	165	68.5	10.9	15.8	4.8
Kosithowornchai et al[10]	144	17	23	47	13
Jansisyanont et al[11]	92	29.9	19.6	46.2	4.3
Lopez et al[12]	80	41.3	10.5	36.3	11.9
Nirmale et al[13]	84	47.6	27.97	13.6	10.71
Varma et al[14]	193	13	42	29	6
Smita T et al[15]	50	42	10	36	12
Padmavathi et al[16]	65	29.23	19.23	33.84	17.7
Smrity et al[17]	102	50	11.76	33.82	2.9
Sophia MM et al[18]	50	49	23	18	10
Present study	90	15.55	21.67	42.22	20.56

Table 4: Comparison of various studies for height and distance of lingual.

Author	No	Lingula to anterior border of ramus (mm)	Lingula to posterior border of ramus (mm)	Lingula to mandibular notch (mm)	Lingula to base of mandible (mm)	Height of lingual (mm)
Suwadee et al[19]	72	20.70 ± 2.27	18.88 ± 3.03	16.41 ± 3.60	35.79 ± 3.38	-
Jansisyanont et al[11]	92	20.6 ± 2.4	18.0 ± 2.6	16.6 ± 2.9	-	8.2 ± 2.3
Samanta et al[20]	100	20.0 ± 2.4	15.0 ± 2.7	15.4 ± 2.7	-	-
Padmavathi et al[16]	65	21.32 ± 4.12	19.61 ± 3.30	18.62 ± 3.71	36.05 ± 4.12	7.41 ± 2.23
Sophia MM et al[18]	50	17.11 ± 2.32	14.86 ± 2.54	18.71 ± 3.18	30.30 ± 5.11	7.45 ± 1.48
Present study	90	16.62 ± 3.31	15.94 ± 1.63	16.05 ± 2.85	34.16 ± 2.96	7.75 ± 1.81

Sphenomandibular ligament attached to lingula because the spine of sphenoid, the sphenomandibular ligament and the part of the mandible bearing the lingula have a common origin from the Meckels cartilage of first branchial arch [5]. The exact reason for the variations in the lingular shapes is not understood. The role of the sphenomandibular ligament in altering the shape is negligible [1]. Lingula is triangular in shape according to standard text books [3,6].

Truncated type was described by Hollinshead [7]. Nodular type was described by Berkovitz et al [8]. The assimilated type described by Morgan et al[9]. In present study, we found truncated shaped lingula was most prevalent (42.22%) which were similar to study done by Kosithowornchai et al.[10], Jansisyanont et al. [11], Padmavathi et al.[16], Smrity et al.[17]. In contrast to our study, triangular shaped lingula was most prevalent in study done by Nirmale et al.[13], Tuli et al.[1], Lopez et al.[12], Smita T et al.[15], Sophia MM et al.[18]. Triangular shaped lingula was least prevalent in our study, in

contrast to our study Tuli et al.[1], Jansisyanont et al.[11], Nirmale et al.[13], Varma et al. [14], Padmavathi et al [16], Smrity et al [17], Sophia MM et al.[18] found assimilated shaped lingula were least prevalent in their studies.[Table 3].

In present study, the average height (Mean ± SD) of the lingula was 7.75 ± 1.81 mm on both sides which is similar to study conducted by Padmavathi et al.[16] and Sophia MM et al.[18]. Average distance of lingular tip to anterior and posterior border of ramus of mandible was 16.62 ± 3.31 mm and 15.94 ± 1.63 which is less as compared to other studies. Average distance of lingula from mandibular notch and base of mandible were 16.05 ± 2.85 mm and 34.16 ± 2.96 mm which were more or less similar to the findings of other studies.[Table 4]. The knowledge of shape, position and height of lingula is important to oral and maxilla-facial surgeons while doing procedures like bilateral sagittal-split ramus osteotomy, intra oral vertical ramus osteotomy and inferior alveolar nerve block. It is also helpful in anthropology, anatomists and

forensic study.

CONCLUSION

The present study provides information regarding the shapes, height and location of the lingula in relation to the mandibular landmarks in north Gujarat population. These findings may be helpful for dental surgeons to locate the lingula and important structures nearby while doing surgical procedures to avoid its damage.

Conflicts of Interests: None

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How to cite this article:

Umesh P Modasiya, Sanjaykumar D Kanani, STUDY OF THE LINGULA IN DRY HUMAN MANDIBLES AND ITS CLINICAL SIGNIFICANCE. *Int J Anat Res* 2018;6(2.2):5218-5221. DOI: 10.16965/ijar.2018.160