

Morphological analysis of the lingula in dry mandibles of individuals in North India

Smrity Gupta¹, Krishna Pandey²

¹Department of Anatomy, GSVM, Medical College Kanpur, India

²Department of Anatomy, MLN, Medical College, Allahabad, India

Abstract: *The relationship of lingula to the inferior alveolar nerve is of clinical significance to dental surgeons in oral and maxillofacial surgical procedure. This study aims to investigate the shape of the lingula in relation to surrounding structures for sagittal ramus osteotomy, for this purpose 102 dried North Indian mandibles were studied and compared with other races. In our study we found that the incidence of triangular lingula was 50% followed by truncated type lingula (33.82%) then nodular type lingula (11.76%) and least frequent incidence of assimilated type lingula (2.9%) was found in the population of North India.*

Keywords: *assimilated, inferior alveolar nerve, lingula, triangular, truncated.*

I. Introduction

The Lingula of the mandible is a sharp tongue-shaped bony projection on the medial aspect of ramus. It is an important landmark as it lies in close proximity to the mandibular foramen that continues along the mandibular canal. This canal goes from the ramus to the body, below the alveoli and connected to the nerve and the inferior alveolar vessels. The inferior alveolar nerve goes into the mandibular foramen together with the inferior alveolar artery. It innervates the lower lip and the chin skin after passing through the mental foramen. The lingula lies where the sphenomandibular ligament is inserted. Due to its connection to nerve and vascular structures the study of lingula provides important information related to oral and maxillofacial surgical procedures, such as the sagittal split ramus osteotomy and the intraoral vertico-sagittal ramus osteotomy carried out to correct dental facial deformities as prognathism. The lingula is used for identifying the site for injection of local anaesthetics or for excision of nerve for facial neuralgia.

Most of the complications are local and temporary, although there may have some rare systemic complications after intra-oral local anaesthesia. A rare but serious complication, permanent damage of the inferior alveolar nerve and lingual nerve, may result from inferior alveolar nerve block (IANB) but the exact mechanism is still unknown. The position of the lingula was also investigated in the inferior alveolar nerve blockage in children and adults.

Researchers analyzed the morphological characteristics of the mandibular foramen and the lingula, and they arrived at the conclusion that such structure's variability would account for failure to block the inferior alveolar nerve. This study aims to analyze the shapes of the lingula and to record data about the various shapes of lingula found in dry adult human mandible of North Indian population in Allahabad Region.

Material and Methods

One hundred and two dry mandibles of adult individuals were studied. The analysis of the lingula characteristics which is the aim of this study was conducted mainly through observation, without measurement tools because it was not possible to measure the lingula with precision as the exact point forming the base could not be ascertained. In each mandible, the lingula were scored using the classification proposed by Tuli et al (1). Depending on the shapes of the lingula, they were classified into 4 types: (1) triangular; (2) truncated; (3) nodular and (4) assimilated. Type (1) or the triangular lingula had a wide base and a narrow rounded or pointed apex. In type (2) or truncated lingula top of its bony projection appeared somewhat quadrangular. The type (3) lingula was nodular and of variable size, almost the entire lingula except for its apex merged into the ramus. In Type (4) or assimilated lingula was completely absorbed or assimilated one.

TRIANGULAR AND TRUNCATED LINGULA



ASSIMILATED AND NODULAR LINGULA



Observation

Triangular lingula were found in 102 (50%) sides and in 49 mandibles (98 sides), it were present on both the right and the left side. The unilateral assessment showed that 3 triangular shape lingula occurred on the right side and 1 triangular shape lingula on the left side. The truncated lingula were present on 69 (33.82%) sides; bilaterally present truncated lingula in 33 (66sides) mandibles, unilaterally present truncated lingula 1 on right side and 2 on left side of the mandible.

The nodular type of lingula were noticed on 27 sides (11.76%) in 12 mandibles (24 sides) present on both right and left sides; whereas unilaterally present 2 nodular lingula on right and 1 nodular lingula on left side. The assimilated lingula were found on 6 sides (2.9%) in 2 of mandibles bilaterally present and unilaterally present assimilated lingula in 2 sides both on the right side.

Type	Shape of Lingula	Total no of sides	Total percentage
1.	Triangular	102	50%
2.	Truncated	69	33.82%
3.	Nodular	27	11.76%
4.	Assimilated	6	2.9%

Distribution of the Lingula, in Adult Human Mandibles (204 sides)

Distribution and Incidence (in parentheses) of Bilateral or Unilateral Lingula

Type	Shape of Lingula	Bilateral	Right	Left
1.	Triangular	98	3	1
2.	Truncated	66	1	2
3.	Nodular	24	2	1
4.	Assimilated	4	0	2

II. Discussion

Lingula meaning “little tongue”, has been described in relation to the mandibular foramen as a bony elevation partially covering it. It was described by Johannes-Baptist Spix in 1815 and was therefore named ‘Spix's ossicle or spine’ (Dobson 1962). The opening of the mandibular canal is covered anteriorly by the lingula, which works as a region where the sphenomandibular ligament can be fixed. (Gardner 1992; Williams, Bannister Berry et al. 1995; Abrahams, Hutchings and Marks 1998)

The approach on this small lingula shaped projection in some papers is limited to the assimilated type, the triangular type directed towards the mandibular condyle and the assimilated type and nodular type, or to the one which has a free projection only towards the mandibular condyle (Abrahams, Hutchings And Marks 1998). Most references on the morphological aspects of the lingula in early studies are incomplete or nonexistent, except in kinds of lingula in Indian origin mandibles (Tuli, Choudhry, Choudhry et al. 2000).

They studied 165 dry adult human mandibles 131 males and 34 females of Indian origin and found that the distribution and incidence of the various types of lingula both in male and female mandibles majority consists of triangular lingula followed by truncated then nodular and least found assimilated type of lingula and there were higher incidence of the tip directed towards the condyles in the triangular lingula than towards the posterior border.

The frequency of the bilaterally truncated type and nodular type of lingula in south Indian mandibles were more noticed and the frequency of occurrence of assimilated type, whether unilateral or bilateral were less Devi et al(2). In a study of the Thai population the truncated lingula were prevalent, followed by the nodular type, then triangular type and assimilated type lingula Kositbowornchai et al(3).

On analysis of population in Southern Brazil triangular lingula and truncated lingula were more frequent Lopes et al(4). In our study we found the incidence of triangular lingula (50%) were most frequent followed by truncated lingula then nodular type lingula and least frequent assimilated lingula.

III. Conclusion

The relationship of lingula to the inferior alveolar nerve is of clinical significance to dental surgeons in oral and maxillofacial surgical procedure. It becomes a necessity to know the morphology of lingula so as to preserve the important structures during surgical interference of mandible around the lingual region.

In our study we found that the incidence of triangular lingula (50%) more frequent both bilaterally and unilaterally in mandibles followed by truncated type lingula (33.82%) then nodular type lingula (11.76%) and least frequent incidence of assimilated type lingula (2.9%) in North Indian population

References

- [1] Tuli A, Choudhry R, Choudhry S, Raheja S And Agarwal S Variation in shape of the lingula in the adult human mandible. *Journal of Anatomy*, 2000, vol. 197, n. 2, p. 313-317.
- [2] Devi R, Arna N, Manjunath K Y, Balasubramanyam Incidence of morphological variants of mandibular lingual. *Indian J Dent Res.*, 2003, Oct-Dec;14(4):210-3.
- [3] Kositbowornchai S, Siritapetawee M, Damrongrungruang T, Khongkankong W, Chatrchaiwiwatana S, Khamanarong K, Chanthaooplee T Shape of the lingula and its localization by panoramic radiograph versus dry mandibular measurement. *Surg Radiol Anat.*, 2007, Dec;29(8):689-94.
- [4] Lopes, PTC., Pereira, GAM. and Santos, AMPV. Morphological analysis of the lingula in dry mandibles of individuals in Southern Brazil *J. Morphol. Sci.*, 2010, vol. 27, no. 3-4, p. 136-138.