

## Analysis of Shape of Lingula in Dry Adult Human Mandible in a Bangladeshi Population

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### Abstract

The lingula is an important anatomical landmark used in oral and dental surgeries and to block the inferior alveolar nerve. Our study aims to analyze different types of lingula found in mandibles of Bangladeshi individuals. This cross-sectional, descriptive study was done on 150 fully ossified dry human mandibles in the Department of Anatomy, Mymensingh Medical College, Mymensingh, Bangladesh between July 2019 and June 2020. A non-random purposive sampling technique was adopted. The lingula was classified into four types: triangular, truncated, nodular and assimilated. The triangular shape was most commonly found (67%), followed by truncated (19.33%), nodular (9.66%) and assimilated (4%). On right side of the mandible, the triangular shape was present in 61.33% samples and on left side, in 59.33% samples. Truncated shape was found 25.33% on right side and 26.66% on left. Nodular shape was present in 10% on right side and 9.33% on left. Assimilated shape was observed in 3.33% on right side and 4.66% on left. Knowledge of various morphological shapes helps dental and maxillofacial surgeons to preserve important structures like inferior alveolar nerve and vessels during surgical interventions of mandible. Our data is expected to increase the information pool, which will be useful for further anthropological studies.

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### Introduction

The mandible, the lowest, strongest, and largest bone in the face, has a horizontally curved body, convex forwards and two broad rami, ascending posteriorly.<sup>1</sup> The lingula of mandible is a tongue

shaped bony projection on the medial aspect of ramus of both sides. It is an important landmark because it's close proximity to mandibular foramen that leads to mandibular canal.

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The canal contains inferior alveolar vessels and nerve. Sphenomandibular ligament is attached with the lingula. The lingula is used for identifying the site for injection of local anesthetics or for excision of nerve for facial neuralgia. Depending on the shape of the lingula they were classified into four types: (1) triangular (2) truncated (3) nodular (4) assimilated. Researchers analyzed that lingula's variability would account for failure to block the inferior alveolar nerve. Due to its connection to nerve and vascular structures, the study of lingula provides important information for oral and maxillofacial surgical procedures like sagittal split ramus osteotomy and intra-oral vertico-sagittal ramus osteotomy carried out to correct dental facial deformities.<sup>2</sup>

## Methods

The cross-sectional, descriptive study was performed between July 2019 and June 2020 in the Department of anatomy, Mymensingh Medical college, Mymensingh, Bangladesh. A total of 150 samples were collected (fully ossified dry human mandibles) by non-random purposive sampling technique from the Department of Anatomy of Mymensingh Medical College and Community Based Medical College, Bangladesh (CBMC,B). Unossified, broken and abnormal bones are excluded. Various shapes of lingula like triangular, truncated, nodular and assimilated were observed on both right and left side of ramus. 1) Triangular: Had a wide base and a pointed apex 2) Truncated: bony projection appearing quadrangular 3) Nodular: entire lingula except apex merged into ramus 4) Assimilated: lingula completely incorporated into ramus. All the data were double checked,

compiled and sorted properly. Analyzed data were displayed in tabulated form. The study was approved by the Ethical Review Committee of Mymensingh Medical College, Mymensingh, Bangladesh.

**Fig. 1:** Shape of lingula (a) truncated (b) nodular (c) triangular (d) assimilated



## Results

There were variations in shape of lingula. In total samples, 67% (201) cases were found triangular, 19.33% (58) cases were found truncated, 9.66% (29) cases were found nodular, and 4% (12) cases were found assimilated (Table-I). On the right side of the mandible, 61.33% (92) cases were found triangular, 25.33% (38) cases were found truncated, 10% (15) cases were found nodular, and 3.33% (5) cases were found

assimilated (Table-II). On the left side of the mandible, 59.33% (89) cases were found triangular, 26.66% (40) cases were found truncated, 9.33% (14) cases were found nodular, and 4.66% (7) cases were found assimilated (Table-III).

**Table-I:** Different Shapes of Lingula in Total Samples (n=300)

Shapes of Lingula	Frequency	Percentage
Triangular	201	67
Truncated	58	19.33
Nodular	29	9.66
Assimilated	12	4

**Table-II:** Different Shapes of Right Lingula of Mandible (n=150)

Shapes of Lingula	Frequency	Percentage
Triangular	92	61.33
Truncated	38	25.33
Nodular	15	10
Assimilated	5	3.33

**Table-III:** Different Shapes of Left Lingula of Mandible (n=150)

Shapes of Lingula	Frequency	Percentage
Triangular	89	59.33
Truncated	40	26.66
Nodular	14	9.33
Assimilated	7	4.66

## Discussion

In this study, various shapes of lingula were observed. In total samples, the triangular shape took a clear lead among all shapes as found in

67% cases. On the right side of mandible, this shape was present in 61.33% cases and on the left side, it was present in 59.33% cases. Similar observations were made by Srimani, Goswami & Mazumdar<sup>3</sup>, Sophia, Alagesan & Ramchandran<sup>4</sup>, Tapas<sup>5</sup>, Gupta & Pandey<sup>2</sup>, Sanmugam<sup>6</sup>, Samanta & Kharb<sup>7</sup> as 51.39%, 49%, 42%, 50%, 48%, 61.6% respectively. The shape of second position in this study was truncated that was found in 19.33% cases in total samples. On right side of mandible this shape was found in 25.33% cases and on left side it was 26.66% cases. But the finding of following authors did not match with this study as they gave the lead to truncated shape. Alves & Deana<sup>8</sup>, Padmavathi *et al.*<sup>9</sup>, Modasiya & Kanani<sup>10</sup> described as 49%, 33.84%, 42.22% respectively. The nodular shape was found in 9.66% cases in total samples, on right side 10% cases and on left side 9.33% cases. This finding was nearly equals to Tapas<sup>5</sup>, Gupta & Pandey<sup>2</sup> as 10% and 11.76% respectively but lower than Srimani, Goswami & Mazumdar<sup>3</sup>, Jung, Cho & Hwang<sup>11</sup>, Sophia, Alagesan & Ramchandran<sup>4</sup>, Alves & Deana<sup>8</sup>, Padmavathi *et al.*<sup>9</sup>, Samanta & Kharb<sup>7</sup>, Modasiya & Kanani<sup>10</sup> as 20.83%, 54%, 23%, 26.5%, 19.23%, 31.6%, 21.67% respectively but higher than that of Sanmugam<sup>6</sup> (7%). In this study, the assimilated shape was found in 4% cases in total samples, 3.33% cases on right and 4.66% cases on left side of mandibular ramus which was agreed with Srimani, Goswami & Mazumdar<sup>3</sup> as 4.17%, but lower than Sophia, Alagesan & Ramchandran<sup>4</sup>, Tapas<sup>5</sup>, Padmavathi *et al.*<sup>9</sup>, Sanmugam<sup>6</sup>, Samanta & Kharb<sup>7</sup>, Modasiya & Kanani<sup>10</sup> as 10%, 12%, 17.70%, 19%, 11.6%, 20.56% respectively. Jung, Cho & Hwang<sup>11</sup>, Gupta & Pandey<sup>2</sup>, Alves & Deana<sup>8</sup> found lower percentage of this variety than this study as 2.4%, 2.9%, 1.2% respectively.

## Conclusion

Lingula act as an important landmark for some common dental surgical procedures to correct dento-facial deformities as prognathism. Improper localization of lingula may result in hemorrhage, fracture or nerve injury during operation. Lack of precise knowledge on varying shapes of lingula may cause surgical failure. This study was done to focus on the shapes of lingula and to provide a clear data for anatomists and surgeons for further study that will enrich the pool of information in our population.

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