

Morphological Variations of Lingula in South Indian Mandibles

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ABSTRACT

The shape of lingula was studied in 193 mandibles. Of these 173 showed bilateral symmetry. Five different shapes of lingula were identified – Nodular, truncated, triangular, assimilated and M shaped. In majority i.e, in 42% of mandibles, the lingula was seen to be nodular. This is in contrast to the studies done by earlier authors.

INTRODUCTION

The ramus of mandible presents on its medial surface a little above its centre an irregular foramen called the mandibular foramen. This foramen is guarded by a thin sharp tongue shaped projection in its proximity called the lingula. This foramen transmits the inferior alveolar nerve and the corresponding artery to the mandibular canal (Grays) ^[1]. Here in , the nerve supplies the pulps of all the teeth located on lower jaw and ends by supplying the lower lip and skin over the chin by its terminal branch, the mental nerve emerging from the mental foramen.

Because of the proximity of lingula to this foramen and in turn to this neurovascular bundle, it is used as an important landmark for injection of local anaesthetics or for excision of the nerve in facial neuralgias of lower jaw or for surgical procedures on lower jaw. Standard books provide little knowledge about the variability in morphology of lingula. Earlier studies have been done by authors from different regions to determine the variable shape of lingula ^[2,3] and many others.

Keeping the above factors in view, the present study is undertaken to analyse the different forms of presentation of lingula and its relation to the mandibular foramen in dry adult mandibles in this region of South India.

MATERIALS AND METHODS

This study has been carried out on 193 dry adult mandibles obtained from the department of Anatomy, Bangalore Medical College & Research Institute, Bangalore. The shape of the lingula and its relation to the mandibular foramen has been observed and the observations noted.

RESULTS

Based on the observations, five different shapes of lingula have been identified.

1. Nodular : where in the lingula is not a prominent projection (fig 1)

Fig 1: Nodular lingula



2. Truncated : where in the lingula presents as a flat projection with blunt apex (fig 2)

Fig 2: Truncated lingula



3. Triangular : where in the lingula presents as a triangular projection with a sharp apex (fig 3)

Fig 3: Triangular lingula



4. Assimilated : here the lingula does not stand out as separate projection instead it forms almost whole or whole of the anteromedial wall of the mandibular foramen (fig 4)

Fig 4: Assimilated lingula



5. M shaped : here the projectile lingula presents with two sharp apices (fig 5)

Fig 5: M shaped lingula



Of the 193 mandibles studied 173 showed bilateral symmetry in shape while 20 showed bilateral asymmetry in shape . Among the mandibles with symmetrically shaped lingula the following observations were made:

- In 81/193 (42%) the lingula was not prominent i.e. nodular
- In 46/193 (29%) the lingula was truncated in shape
- In 25/193 (13%) the lingula was triangular in shape
- In 13/193 (6%) the lingula was assimilated
- In 8/193 (4%) the lingula was M shaped

Among the mandibles with asymmetrical lingula , 13 showed on one side triangular and one side nodular lingula. The rest 7 showed on one side truncated and other side nodular lingula.

In addition it has been observed that in 109 (56%) mandibles the lingula formed 1/4th or less than 1/4th of the anteromedial wall of the mandibular foramen. Where as in 71 (39%) it forms 1/2 or more than half of the anteromedial wall of the mandibular foramen .While in the remaining 13(6%) the lingula forms almost whole or whole of the anteromedial wall of the mandibular foramen

DISCUSSION

The word lingula also called ligula mandibulae or the spix's spine (Robert Ireland) [4] is a bony spine on the border of the inferior alveolar foramen of the mandible to which is attached the sphenomandibular ligament. The other end of this ligament being attached to the spine of sphenoid. The spine, the ligament and this part of the mandible bearing the lingula have a common origin from the Meckel's cartilage of first branchial arch (Keith LM) [5]. It forms the anteromedial wall of the mandibular foramen and the mylohyoid groove descends downwards and forwards from behind the lingula.

It serves as an important land mark for procedures on mandible. The most common surgical method to correct mandibular deformities is bilateral sagittal split osteotomy (BSSO). An important landmark for this procedure is lingula (Maina Gite) [6]. Researchers analysed that structural variability in lingula can account for failure in anaesthetic block of inferior alveolar nerve (Nicholson) [7].

Standard books describe the shape of this projection to be triangular. Several studies have been done on morphology of lingula. Tuli et al [2] have carried out a study on 165 dry mandibles of Indian origin, to determine the shape, direction and borders of lingula. They found triangular lingula in 68.5% mandibles, truncated, nodular and assimilated shape in 15.8%, 10.9% and 4.8% respectively.

Devi, Arna et al [3] also reported bilateral truncated type and nodular type as the most frequent ones in Indian mandibles.

Study on 144 dry mandibles of Thai population by Kositbowornchai et al [8] showed truncated (47%) to be most common followed by nodular, triangular and assimilated in 23%, 17% and 13% respectively.

Jansisyanont et al [9] studied on 92 Thai cadavers and found truncated lingula in 46.2% cases, triangular, nodular and assimilated shape in 29.9%, 19.9% and 4.3% respectively.

Lopes, Pereira et al [10] did a study on 80 dry mandibles in south of Brazil. In their study the triangular shape of lingula was found in 41.3%, truncated in 36.3%, nodular in 10.5% and assimilated in 11.9%.

Contrary to the above studies, this study shows nodular lingula in 42%, truncated in 29%, triangular in 13%, assimilated in 6% and M shaped in 4%. As to why the shape of the lingula varies is not understood. According to Tuli et al [2] the sphenomandibular ligament which is attached to the tip of the lingula is an accessory ligament to the temporomandibular joint and has minimal influence on altering the shape of the lingula. The fact that majority of mandibles are presenting with nodular lingula (42%), gives way for the speculation that this important landmark in mandible may be disappearing in the process of evolution.

However the present study provides the morphological variation and the relation of lingula with the mandibular foramen. A prior knowledge of this altering shape and its relation to the mandibular foramen will minimise the damage to the important nerves and vessels related to it be it during anaesthetic block or during operative procedure on the lower jaw. The observations made in this study enable us to reconsider the conventional shape of lingula mentioned in standard books.

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