International Journal of Anatomy and Research,
Int J Anat Res 2019, Vol 7(3.1):6744-47. ISSN 2321-4287
DOI: https://dx.doi.org/10.16965/ijar.2019.215

Original Research Article

STUDY OF PATTERN OF DISTRIBUTION OF MYLOHYOID BRIDGING AND THEIR CLINICAL IMPLICATIONS

Urvi H. Dave *1, **Sunita Gupta** 2, **Rajesh B. Astik** 3.

1 Ph.D. Scholar (Student), Tutor, Department of Anatomy, GCS Medical College, Ahmedabad, Gujarat, India.

2 Professor and Head, Department of Anatomy, AMC MET Medical College, Maninagar, Ahmedaad, Gujarat, India.

*3 Professor and Head, Department of Anatomy, GMERS Medical College, Himmatnagar, Gujarat, India.

ABSTRACT

Background: The occurrence of mylohyoid bridges in mandible resulting compression of inferior alveolar and mylohyoid nerves, and vessels, is important cause of neuropathy in this region.

Aim and objective: The present study was aimed at analyzing influence of sex and laterality in the occurrence of mylohyoid bridging in Indian population, and establishing a clue to the underlying causes of paraesthesia of idiopathic origin, in the territory of inferior alveolar and mylohyoid nerves.

Methods: We studied 300 human mandibles (141 female and 159 male) for location and degree of mylohyoid bridging.

Results: We found mylohyoid bridges in 15.66% mandibles. The proximal bridging was found more frequently than the distal bridging. The mylohyoid bridges were found in 7.8% female and 13.2% in male mandibles studied. We found mylohyoid bridges on 5% on right side and 5.66% on the left side, bilateral bridging was found in 5.33% mandibles.

Conclusion: The frequency of occurrence of mylohyoid bridging was higher in male; however, laterality was not to be significant amongst the mandibles studied. The location and degree of mylohyoid bridging are one of the important etiological factors of paraesthesia in the region of inferior alveolar and mylohyoid nerves distribution.

KEY WORDS: Mandible, Mylohyoid Groove, Inferior Alveolar Nerve, Paraesthesia.

Address for Correspondence: Dr. Urvi H. Dave. C/O Dr. Rajesh B. Astik. Pofessor and Head, Department of Anatomy, GMERS Medical College, Near Government Polytechnic College, Gadhoda Road, Himmatnagar, Gujarat. 383001, India. Telephone: +91-9687336803; +91-9106387517. **E-Mail:** astikrajesh@yahoo.co.in

Access this Article online	Journal Information
Quick Response code	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
DOI: 10.16965/ijar.2019.215	**Article Information** Received: 30 Apr 2019 Peer Review: 30 Apr 2019 Revised: None Accepted: 10 Jun 2019 Published (O): 05 Jul 2019 Published (P): 05 Jul 2019

INTRODUCTION

Mylohyoid groove runs downward and forward from the mandibular foramen and lodges mylohyoid nerve and vessels. Connective tissue may be extended further from lingual end of sphenomandibular ligament for a varied length, and might be ossified entirely or in part tobecome canal or bridge respectively [1].

Mylohyoid bridge may compress mylohyoid nerve, imparting neurological disturbances. The Mylohyoid nerve itself is known to present many variations in its course and distribution [1,2].

Therefore presence of mylohyoid bridge could further worsen neurological disorders associated with mylohyoid nerve. Since mylohyoid bridging is known to manifest a wide range of variations in incidence and pattern of distribution on the inner surface of the mandible among different races and sexes, frequency of occurrence of mylohyoid bridging and its pattern of distribution was studied in the Indian population.

Ossenberg suggested that mylohyoid bridge is result of ossification of the membrane extended from sphenomandibular ligament to continue distally for a varied length of course medial to mylohyoid nerve and vessels [3].

Mylohyoid bridge may be seen as complete and/or incomplete [3-6]. As mylohyoid bridge possibly interferes with administration of lower teeth anesthesia, the study of its incidence and pattern of distribution may greatly help the dental surgeons.

Racial and sexual variations in occurrence and pattern of distribution of mylohyoid bridges were reported in literature; however, no consistent trend has been presented. In this study, the incidence and pattern of distribution of mylohyoid bridging were examined in the male and female mandibles of the Indian populations. The aim is to utilize the data to determine the role of sex and laterality in the occurrence of mylohyoid bridging, and for successful administration of anesthesia during lower teeth surgeries.

MATERIALS AND METHODS

We studied 300 human mandibles for frequency of occurrence and pattern of distribution of mylohyoid bridging. The mandibles were obtained from the Anatomy Department of various medical colleges in the Gujarat. Out of 300 mandibles studied, 141 female and 159 male mandibles were categorized by presence or absence of a distinct flexure on the posterior border of the ramus at the occlusal plane [7], and other morphological features such as general size, chin shape, gonial angle, gonial flare, and muscular markings.

Location of mylohyoid bridge was classified as proximal bridging if bridging is found 0-2 centimeter distant from lower margin of the mandibular foramen, and as distal bridging if bridging is more than two centimeter distal to the mandibular foramen. Digital sliding vernier caliper was used to measure distance of proximal edge of mylohyoid bridge from lower margin of the mandibular foramen.

The degree of bridging found was classified as partial bridging and total bridging.

The data were analyzed for significance of the occurrence in relation to sex and laterality by means of chi-square test with the level of significance set at $p < 0.05$.

Fig. 1: Proximal partial type of mylohyoid bridging.

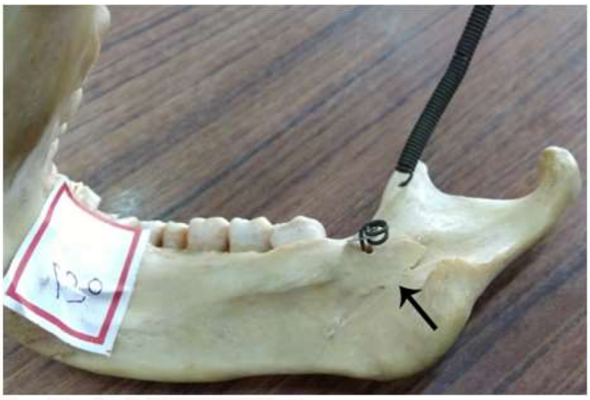

Fig. 2: Distal partial type of mylohyoid bridging.

RESULTS

Out of 300 mandibles studied, mylohyoid bridges were found in 15.66% (47 of 300) mandibles. The proximal mylohyoid bridges were found in 9% (27 of 300) mandibles (Fig.1). The distal mylohyoid bridges were found in 6.66% (20 of 300) mandibles (Fig. 2). We did not find complete bridging in any mandible studied.

The mylohyoid bridges were found in 7.8% in female mandibles (22 of 282 mandible sides); and in 13.2% male mandibles (42 of 318 mandible sides). The frequency of distribution of mylohyoid bridging was found to be statistically significant among sexes (Table 1).

Table 1: Frequency of distribution of mylohyoid bridges.

In Female			In Male		
Right	Left	Bilateral	Right	Left	Bilateral
5	7	5	8	10	12

Mylohyoid bridges were found in 5% on the right side (30 of 600 mandible sides) and 5.66% (34 of 600 mandible sides) on the left side (Table 1). Bilateral mylohyoid bridges were found in 5.33% (17 of 300) mandibles. However, this difference was found not to be significant statistically.

DISCUSSION

The Mylohyoid Bridge was found in 15.66% amongst 300 mandibles, obtained from the Indian population. The frequency of mylohyoid bridging was recorded as 5% for the right side and 5.66% for the left side. This figure corresponds to a value provided in American populations by Sawyer et al [4].

Incidence of occurrence of mylohyoid bridging is compared with previous studies (Table 2).

Table 2: Racial variations of occurrence of mylohyoid bridging.

Population	No. of mandibular sides	%	Author
Europe, France	844	0.47	Ossebnerg [3]
Japanese	354	4.2	Dodo [8]
Andhra Pradesh (India)	152	4.6	Kaul and Pathak [6]
Eskimo, Alaska	529	5.5	Ossebnerg [3]
Australia, Aborigines	605	6.1	Ossebnerg [3]
Indian	**600**	**15.66**	**Present study**
American	234	15.4	Sawyer et al. [4]
Amerind	126	26.2	Ossebnerg [3]
Aleut	267	30	Ossebnerg [3]
Khoisan	146	32.2	Lundy [9]

Results showed that mylohyoid bridging more frequently occurred in Amerind and Aleut, and Khoisan population than do other samples [3,9]. Frequency of occurrence of mylohyoid bridging was found to be lower in the French and Japanese population [3,8]. This suggested racial influence in occurrence of the mylohyoid bridges.

In the present study, mylohyoid bridges were found in 7.8% in female and 13.2% in males, and found to be significant statistically. Ossenberg, Dodo, Sawyer et al., and Furuta observed higher frequency rates of mylohyoid bridging in males than in females, corresponding with the present study [3,4,8,10]. These findings indicate that the expression of mylohyoid bridge appears to be dependent on sex. However, Lundy observed little difference in the incidence of mylohyoid bridging between sexes in the Khoisan sample, and Corruccini detected similar frequency rates in both sexes [9,11].

In the present study, laterality was not found in frequency of mylohyoid bridging while Furuta found out a relatively high symmetric rate [10]. Dodo determined a remarkable asymmetry in frequency [8]. Sawyer et al. and Ossenberg found powerful trend of symmetry [4,12]. The difference between sides is not significant statistically, suggesting environmental factors may be causative for formation of mylohyoid bridges.

Position of mylohyoid bridge exhibited variations depending on populations. In present study, proximal type (9%) was observed more frequently than distal type (6.66%). The proximal bridging occurs due to extension of connective tissue from sphenomandibular ligament that is ossified later. This may compress the inferior alveolar nerve or influence the inferior alveolar nerve block. Ossification of connective tissue over mylohyoid groove resulted in the distal bridging.

Jidoi et al., Hanihara and Ishida observed higher frequency of proximal type in the Europeans, however, proximal type was not restricted to the Europeans, but also occurred in Arctic and Sub-Saharan African populations [13,14].

Formation of mylohyoid bridge begin during relatively early phase of development when an individual has been less influenced by environmental stresses [13]. Mechanical stresses are not having influence on the formation of the mylohyoid bridges as the Eskimos and Australian Aborigines, who habitually use masticatory apparatus as a tool, do not show a high frequency of occurrence of mylohyoid bridges [15]. The occurrence of mylohyoid bridging and their pattern of distribution revealed that genetic background played pivot role in mylohyoid bridges to appear. However, genetic marker alone in absence of other physical traits may have limitation in their appearance [6].

CONCLUSION

The frequency of mylohyoid bridging falls within known levels of variation. Higher frequency of proximal type of bridging observed reflects genetic similarity to the European and African populations. Frequency of mylohyoid bridging was found to be significant statistically amongst sexes, however, laterality was found not to be significant amongst the mandibles studied. The pattern of distribution and degree of mylohyoid bridging are affecting successful administration of anesthesia during dental surgeries. More in depth studies using other metrical and non- metrical variants, needed to assess the influence of age, sex and race in the formation of mylohyoid bridging.

Conflicts of Interests: None

REFERENCES

[1]. Sato I, Sunohara M, Ueno R, Yoshida S. Branch of mylohyoid and lingual nerves on submandibular and submental triangles. Okajimas Folia Anat Jpn 2004;81(2–3):45–48.

[2]. Asami Y, Kawai K, Kanoh T, Koizumi M, Honma S, Tokiyoshi A, et al. Double innervation of the anterior belly of the digastric muscle. Anat Sci Int 2006;81(2):130–133.

[3]. Ossenberg NS. The mylohyoid bridge: an anomalous derivative of Meckel's cartilage. J Dent Res 1974;53(1):77-82.

[4]. Sawyer DR, Allison MJ, Elzay RP, Pezzia A. The mylohyoid bridge of pre-Columbian Peruvians. Am J Phys Anthropol 1978;48(1):9-16.

[5]. Hauser G, De Stefano GF. Epigenetic variants of the human skull. Stuttgart: E. Schweizerbart'sche Verlag 1989: p 301.

[6]. Kaul SS, Pathak RK. The mylohyoid bridge in four population samples from India, with observations on its suitability as a genetic marker. Am J Phys Anthropol.1984;65(2):213-218.

[7]. Loth SR, Henneberg M. Mandibular ramus flexure: a new morphologic indicator of sexual dimorphism in the human skeleton. Am J Phys Anthropol 1996;99(3):473-485.

[8]. Dodo Y. Non-metrical cranial traits in the Hokkaido Ainu and the northern Japanese of recent times. J Anthrop Soc Nippon 1974;82(1):31-51.

[9]. Lundy JK. The mylohyoid bridge in the Khoisan of Southern Africa and its unsuitability as a Mongoloid genetic marker. Am J Phys Anthropol 1980;53(1):43-48.

[10]. Furuta Y. Morphological studies on the mandible of Indians: the incisura foraminis mandibulae and canalis mylohyoideus. Okajimas Folia Anat Jpn 1982;58(4-6):1073-1102.

[11]. Corruccini RS. An examination of the meaning of cranial discrete traits for human skeletal biological studies. Am J Phys Anthropol 1974;40(3):425-445.

[12]. Ossenberg NS. An argument for the use of total side frequencies of bilateral nonmetric skeletal traits in population distance analysis: the regression of symmetry on incidence. Am J Phys Anthropol 1981;54(4):471-479.

[13]. Jidoi K, Nara T, Dodo Y. Bony Bridging of the Mylohyoid Groove of the Human Mandible. Anthropol Sci 2000:108(4):345-370.

[14]. Hanihara T, Ishida H. Frequency variations of discrete cranial traits in major human populations. IV. Vessel and nerve related variations. J Anat 2001:199:273-287.

[15]. Smith FH. Evolutionary significance of the mandibular foramen area in Neandertals. Am J Phys Anthropol 1978;48(4):523-531.

How to cite this article:

Urvi H. Dave, Sunita Gupta, Rajesh B. Astik. STUDY OF PATTERN OF DISTRIBUTION OF MYLOHYOID BRIDGING AND THEIR CLINICAL IMPLICATIONS. Int J Anat Res 2019;7(3.1):6744-6747. **DOI:** 10.16965/ijar.2019.215