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Variation in the Incidence and Position of Accessory Mandibular Foramen in East Indian Population in Relation to Age

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Abstract: ***The passage of blood vessels and nerves make the accessory mandibular foramen (AMF) clinically important for dental surgeons, anaesthesists, oncologists and radiotherapists. The aim of the present study is to determine the incidence and topography of AMF in young and adult mandibles and highlight its clinical significance. Seventy dried human mandibles irrespective of gender were collected from the Department of Anatomy, S.C.B. Medical College and observed for the presence of accessory mandibular foramen on the medial surface of ramus. Only those foramina with diameter >1mm were taken into account. AMFs were found in 58.57% of mandibles. Out of which 23.62 % were bilateral, 35.1%unilateral i.e., 16.4% left and 18.7% right. In 21.4% of cases AMFs were found above & behind the mandibular foramen and in 14.2% above & infront. It was observed that in younger mandibles AMFs were found bilaterally and in multiples. Thus it was observed that the incidence of AMFs were more in mandibles of younger age group where third molar has not yet erupted. It was also observed that the commonest position was posterosuperior. A proper understanding of the presence or absence of these foramina can provide valuable information regarding the branching pattern of inferior alveolar nerve. The knowledge of additional foramina is important for radiotherapists while planning radiation therapy as spread of tumours following radiotherapy can occur through these foramina.Thus the anatomical details of these foramina are important to various fields of dentistry and oncology for planning their treatment at an appropriate site.***

Keywords: accessory mandibular foramen, mandibular foramen,mandible, inferior alveolar nerve,incidence

1. Introduction

The recent trend of replacement of missing teeth by dental implants and the increasing frequency of orthognatic surgeries have highlighted the clinical significance of accessory mandibular foramen. The passage of blood vessels and nerves makes the accessory mandibular foramen (AMF) clinically important for dental surgeons, anaesthesists, oncologists and radiotherapists. The presence of nerve fibres in AMFs may be significant in the effectiveness of local anaesthesia following inferior alveolar nerve block.Blood vessels present in accessory foramina can be a cause of Intraosseous haemorrhages during implant procedures. This osteological investigation was undertaken to determine the incidence and topography of AMF in relation to age and highlight its clinical significance.

AMFs were found in 58.57% of mandibles. Out of which 23.62 % were bilateral,35.1% unilateral with 16.4% left and 18.7% right. In 21.4% of cases AMFs were found above & behind the mandibular foramen and in 14.2% above & infront.It was observed that in younger mandibles AMFs were found bilaterally and in multiples. Thus it was observed that the incidence of AMFs were more in mandibles of younger age group where third molar has not yet erupted. It was also observed that the commonest position was posterosuperior.

2. Aims and Objectives

This osteological investigation was undertaken to determine the incidence and topography of AMF in relation to age and highlight its clinical significance.

3. Materials & Methods

Seventy dried human mandibles irrespective of gender were collected from the department of anatomy, SCB MCH Cuttack. Mandibles were observed for the presence of accessory mandibular foramen on the medial surface of ramus with the help of a magnifying lens. Only those foramina with diameter >1mm were taken into account.

Bones collected were then grouped into two categories:
I – Young age → third molar not erupted, MF towards base
II - Adult →third molar erupted, MF in middle plus Edentulous mandibles with MF towards the alveolar margin
MF → mental foramen

Exclusion Criteria for selection of mandibles: i) Deformed mandibles. ii) Mandibles with absent mandibular foramen. iii) Foramina with diameter < 1mm.

4. Observation and Results

AMFs were found in 58.57% of mandibles. Out of which 23.62 % were bilateral, 35.1% unilateral with 16.4% left and 18.7% right. In 21.4% of cases AMFs were found above & behind the mandibular foramen, 14.2% above & in front. It was observed that in younger mandibles AMFs were found bilaterally and in multiples. Thus it was observed that the incidence of AMFs were more in mandibles of younger age group where third molar has not yet erupted. S

Table 1: Distribution of AMF in different age groups

Age groups	*No of cases*	*Presence of AMF*
Young	12	18
Adullt	58	23

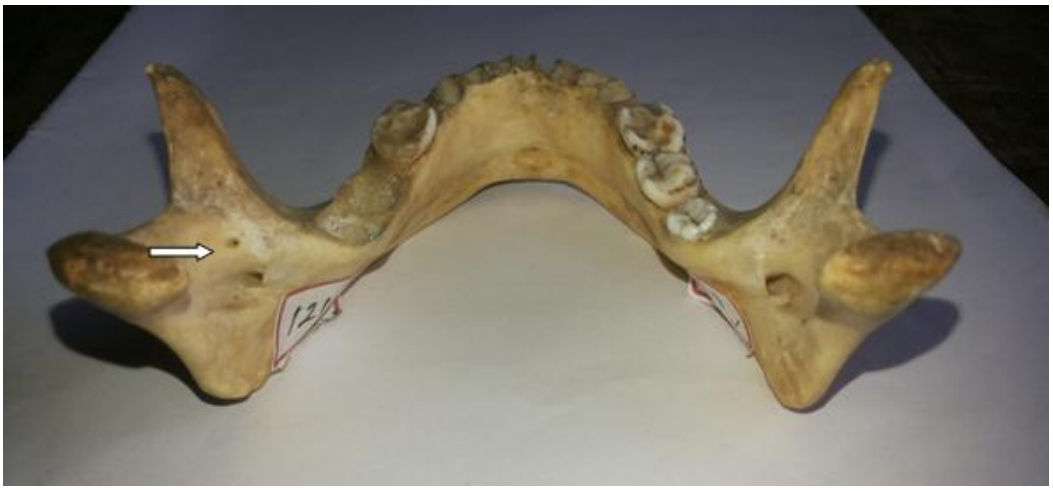

Figure 1: Adult mandible showing single foramen on left side

Figure 2: Adult mandible showing single foramen bilaterally and located posterosuperiorly (commonest position)

Figure 3: Young mandible showing triple accessory foramina on right side and single foramen on left side

5. Discussion

The position of mandibular foramen (MF) has been found to be variable. The variability of the position of the MF makes it difficult to anaesthetize the inferior alveolar nerve (IAN). [1]

The presence of AMFs could be associated with additional branches of the inferior alveolar nerve (IAN) given before the nerve enters the MF. The additional branches of IAN may arise in the infratemporal fossa and may enter the mandible through the accessory foramina to supply the molar tooth (Haveman and Tebo, 1976)[5].Das and Suri (2004)[3] passed a metallic wire through an AMF and examined it radiologically, found that the neurovascular bundle passing through it supplied the root of the third molar. The branching pattern of IAN may also show several variations within the mandibular canal (Rodella et al 2008)[6].

Developmentally the presence of double mandibular canals can be explained as the incomplete fusion of three inferior alveolar nerves that developed initially to innervate three groups of mandibular teeth (Chavez et al 1996) [2]AMFs may also provide a route for spread of infections and tumour following radiotherapy. (Fanibunda and Matthews 1999)[4].

6. Conclusion

A proper understanding of the presence or absence of these foramina can provide valuable information regarding the branching pattern of inferior alveolar nerve.Thus the anatomical details of these foramina are important to various fields of dentistry and oncology for planning their treatment at an appropriate site.

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