



Incidence and Localization of Accessory Mandibular Foramen Ineastindian Population-Asingle Centre Experience

KEYWORDS

Accessory mandibular foramen, Mandibular foramen, Mandible

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ABSTRACT The passage of blood vessels and nerves make the accessory mandibular foramen (AMF) clinically important for dental surgeons, anesthetists, oncologists and radiotherapists. The aim of the present study is to determine the incidence and localization of AMF in adult mandibles in East Indian population and highlight its clinical significance. 160 dried adult human mandibles irrespective of gender were collected from the Department of Anatomy, SCB MCH Cuttack. Mandibles were observed for the presence and precise location 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.

This study shows that AMF was found in 118 mandibles (73.7%) with 31.9% unilateral having 19.4% right and 12.5% left and 41.8 % bilateral . Single AMF was found in 146 cases, double in 32 cases and triple in 4 cases. Incidence of AMF on the right side was more than left by 6.9%. Commonest position was found to be above and behind in 129 (71%) cases with above and in front being 32(17.6%) and below in 20 (11%) cases.

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 for various fields of dentistry and oncology for planning their treatment at an appropriate site.

I. INTRODUCTION :

A thorough knowledge of the location of accessory mandibular foramen (AMF) is an essential prerequisite for implant treatment, mandibular osteotomies and other dental procedures. Accessory mandibular foramen may be associated with blood vessels which provide an easy route for the spread of infection. The inferior alveolar nerve block is the commonest local anaesthetic technique which is used for dental procedures. The failure rate is high due to inaccurate localization of mandibular foramen . There are few references in the literature regarding the exact anatomical location of the accessory mandibular foramen (AMF). Therefore, the present study is aimed to study the incidence and position of accessory mandibular foramen. The knowledge of the commonest position of AMF will avoid complications like hemorrhage and paresthesia during oral and surgical procedures and also for radiotherapists in planning radiation therapy.

II. MATERIAL AND METHOD:

Hundred sixty dried adult human mandibles irrespective of gender were collected from the Department of Anatomy, SCB MCH Cuttack. Mandibles were observed for the presence and precise location of accessory mandibular foramen on the medial surface of ramus with the help of a magnifying lens. Only those foramina with diameter >1 mm were taken into account.

Exclusion criteria for selection of mandibles:

- i) Deformed mandibles.
- ii) Mandibles with absent mandibular foramen.
- iii) Foramina with diameter < 1mm.

Table-1

Incidence of the presence of AMF in 160 (320 sides) dry adult human mandible

AMF		NUMBER	PERCENTAGE %
UNILATERAL	LEFT	20	12.5%
	RIGHT	31	19.4%
BILATERAL		67	41.8%
ABSENT		42	26.3%

- AMF present in 73.7% of mandible, unilateral in 31.9% and bilateral in 41.8%

TABLE-2

POSITION AND NUMBER OF AMF ON THE MEDIAL SURFACE OF RAMUS AROUND THE MF

POSITION	NUMBER						TOTAL
	SINGLE		DOUBLE		TRIPLE		
	LEFT	RIGHT	LEFT	RIGHT	LEFT	RIGHT	
1.ABOVE & BEHIND	39	59	16	12	1	2	129(71%)
2.ABOVE & INFRONT	27	-	4	-	1	-	32(17.6%)
3.ABOVE	-	1	-	-	-	-	1(0.5%)
4.BELOW	6	14	-	-	-	-	20(11%)

• **Commonest position is above & behind (71%)**

OBSERVATIONS: This study shows that AMF was found in 118 mandibles (73.7%) with 31.9% unilateral having 19.4% right and 12.5% left and 41.8% bilateral. Single AMF was found in 146 cases, double in 32 cases and triple in 4 cases. According to laterality, incidence of AMF on the right side was more than left by 6.9%. Commonest position was found to be above and behind in 129 (71%) cases with above and in front being 32 (17.6%) and below in 20 (11%) cases. We also studied the excavated mandible and traced the pathways of both the mandibular canal and accessory mandibular canals. Refer to Fig :6 .



Fig : 1 Showing single AMF on both sides posterosuperiorly (above & behind) → Commonest position .



Fig :2 Showing single foramen(above & infront) on left side and triple foramen on right side



Fig 3 Showing single serratus canal on left and double on right side



Fig : 4 Showing single AMF on the left side (above the MF)



Fig 5 : Showing single foramen on the right side (below the MF)



Fig 6 : showing mandibular canal (MC) and accessory mandibular canal (AMC)

DISCUSSION:

The anatomical variability of incidence and position of AMF should be considered as they may be used to give additional locoregional anaesthesia in case of failed mandibular blocks . The variability of the position of the MF makes it difficult to anaesthetize the inferior alveolar nerve (IAN).¹

The passage of blood vessels and nerves makes the AMF clinically important. The embryological basis of the occurrence of the AMF has been described in the literature². During development, initially, there were three inferior alveolar nerves, which innervate each of the three groups of the mandibular teeth. Later, there is a fusion of these nerves and a single inferior alveolar nerve is formed. The incomplete fusion of these three nerves leads to the development of double or triple accessory mandibular canals. It was reported that, in 60% of the cases, the mandibular canal was found to have the entire inferior alveolar nerve

passing through it, while, in the remaining 40% cases, the nerves were found to be scattered. ⁷ The alternate route through AMF and the awareness about its position is important for achieving successful inferior alveolar nerve blocks.

The presence of AMF makes it more vulnerable to perineural spread of tumor cells from cortical to cancellous part of bone. ⁴ The knowledge of AMF may thus be important for radiotherapist in planning radiation therapy. AMF in the present study was found in 73.7% cases, unilaterality in 31.9% cases. When the AMF was present behind the main foramen and was followed by a canal directed anteroinferiorly, it was named as serres canal by Smith RL et al. ⁸ In thier study, the incidence was 71% . The incidence of accessory mandibular foramina is in accordance with that of the previous studies. The commonest location of AMF in the present study was posterosuperior to the main foramen which also corroborates with the study of Gupta S⁹

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 ⁵. Das and Suri (2004)³ passed a metallic wire through an AMF and examined it radiologically . They 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 ⁶.

Awareness of the presence of AMF may be important in achieving successful Inferior alveolar nerve anaesthesia and so this is best performed at a higher level using the technique also known as Gow- Gates technique ¹⁰. This procedure involves the administration of the anaesthetic solution at a higher level before the division of mandibular nerve .¹¹

CONCLUSION:

In view of the clinical importance of AMF, we as anatomists submit that prior knowledge of the precise location of AMF to increase the success rate of dental anaesthesia in day to day practice Knowledge of the commonest positions will be beneficial for Oncologists , Dental surgeons and Oromaxillofacial surgeons in planning graft implants and decreasing the risk of haemorrhages and paraesthesia during oral surgical procedures .

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