# **Presence of Accessory Mandibular Foramina and Their Clinical Implications**

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### Abstract

A number of studies have reported that the accessory mandibular foramina are located mainly on the internal aspect of the body of the mandible. Accessory foramina are constant structures of human mandible, but their presence may result in complications to clinical dental care, if not properly identified, revealing the importance of studying the incidence of these variations. Furthermore, failures in the anaesthesia by regional blockade of the inferior alveolar nerve are reported due to the presence of these foramina. During the routine visual inspection of the mandible collection housed in the department of anatomy for osteology demonstration to medical and dental students, we found the presence of accessory foramina on the inner and outer surface of the body of the mandible. The knowledge of such anomaly is immensely helpful for dentists to take necessary precaution while giving anaesthesia for any dental procedures in this region.

Keywords: mandible, mandibular foramen, mental foramen, accessory foramina

# Introduction

Presence of all unnamed foramina in the body or ramus of the mandible are named as accessory foramina. Though these foramina are mentioned in the literature their number and distribution is variable. They may transmit the nerve fibres or blood vessels or both. Due to the presence of these accessory foramina the local anaesthesia given during any dental procedure may fail as the branches of the nerves passing through these foramina escape the anaesthesia. The accessory blood vessels contained in them, may result in difficulty in controlling interosseous haemorrhage.

In adults, accessory mandibular foramen are variables and are located on the inner surface of the body of the mandible at variable positions. According to their position they are called as supragenial or supraspinous foramen, infragenial or infraspinous foramen; if found between the four genial or mental spines it is called as genial or spinous foramen. Sometimes foramen may be found lateral to the genial tubercles, called lateral spinous or genial foramen.

Knowledge of accessory foramina, their position and incidence will be helpful for dental surgeons to archive complete anaesthesia.

#### **Case report**

During the routine visual inspection of the mandible collection housed in the department of anatomy for osteology demonstration to medical and dental students, in three mandibles we found the presence of accessory foramina on the inner and outer surface of the body of the mandible. These human mandibles were from cadavers of unspecified sex and unknown ethnic background.

In one mandible on both sides, we found the presence of accessory foramen on both sides of the inner surface of the body of the mandible. On the right side it was situated at the level of first molar tooth, placed 2cm from the alveolar border and 0.5 cm from the base of the mandible (6cm from the angle of the mandible); on the left side it was situated at the level of between the two premolar teeth, placed 2cm from the alveolar border and 0.5 cm from the base of the mandible (7cm from the angle of the mandible) (fig. 1).

In the second mandible, on the left side, we found the presence of accessory mental foramen, at the level of second premolar tooth and was situated in the mid-point between the base and the alveolar border (fig. 2).

On the inner surface of the body of the third mandible, we found the presence of two accessory foramens (genial or spinal foramens) in the midline, situated one below the other (fig. 3).

# Discussion

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In the dry mandible the accessory mandibular foramina refer to all the openings in the mandible, excluding the mandibular and mental foramina. There are many reports confirming the presence of accessory foramina in the human mandible, but their classification and nomenclature are not identical.

Anatomic variations of the mandible may result in clinical complications if not properly identified, revealing the importance of studying the incidence of these variations. Restoration of form and function without violating important anatomic structures is a fundamental goal in the surgical management of patient. From an embryological perspective variations of number in the mandibular canal can be explained because in the early development, the inferior alveolar nerve innervate the anterior teeth group, premolar and the molar region in an independent way. The mandibular accessory foramina were related from its first description with the irrigation and the veined drainage of the temporary teeth's system and of the alveolar processes in formation. From birth, this canal suffers a gradual obliteration during the first year of life. In adults, when these foramina remain, it is considered as an anatomical variation. The accessory innervations caused by the presence of this foramen leads to failures in anaesthesia techniques by regional block of the inferior alveolar (1).

In the past, a number of studies have reported that accessory mandibular foramina are located on the inner surface of the body of the mandible, indicating their potential importance for effective and successful clinical procedures. Foramina were located either superior or inferior to the genial tubercle, as well as lateral to the tubercle. Their frequency, size, and location vary depending on the type of the foramen. It was reported that accessory mandibular foramina when present, are present mainly on the internal surface of the mandible than on its external surface. They are located more frequently in the anterior part of the mandible, though they have also been observed in the retro-molar area or the ramus of the mandible. A vast majority of researchers found the accessory foramen lying in the midline, either superior or within the genial tubercle, and named it therefore the lingual foramen. Sutton referred to this as the midline foramen (2).

The accessory foramina can be considered as frequent anatomical structures and should be taken into account when performing surgical procedures in the mandible. New technologies offering more accurate data and three-dimensional reconstructions have changed the way of understanding the innervation and vascularization of the mandible. This has a direct impact on oral surgery planning and facilitates a better understanding of anaesthetic failures (3).

Accessory foramina of the mandible are usually unnamed and infrequently described, yet they are numerous. Accessory foramina of the mandible are common. They may transmit auxiliary nerves to the teeth (from facial, mylohyoid, buccal, transverse cervical cutaneous and other nerves) (4).

These are usually unnamed and infrequently described. Yet a study of 300 mandibles yielded a count of 2449 accessory foramina (Sutton 1974). Since many transmit auxiliary nerves to teeth, their occurrence is significant in dental blocking techniques (5).

Macroscopic observations revealed the presence of accessory foramina in most of the investigated mandibles. Accessory foramen on the internal surface of mandible are named as supraspinous, infraspinous, or lateral spinous if they are present superior, inferior, or lateral to the genial tubercle, respectively. The supraspinous foramen, also named as lingual foramen, may be regarded as a constant finding with incidence of 88%. The anatomical variability of incidence and position of accessory foramina should be considered as they may be used to give additional loco-regional anaesthesia in case of failed mandibular blocks (6).

The accessory foramen has also been reported to have continuity with the incisive canal. If there is continuity of the accessory foramen with the mandibular canal, one wonders if the mental nerve emerges out through this foramen. This raises serious issues for successful nerve blocks. Calculation of the mean distance of this canal with respect to a bony point may have been more beneficial to maxillofacial surgeons. These may be needed for planning graft implants (7).

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## Conclusion

Macroscopic observations revealed the presence of accessory foramina in most of the investigated mandibles. Incidence of accessory mandibular foramen is significant and should be considered while planning and execution of any dental procedures in order to avoid complications, since many transmit auxiliary nerves to teeth, their occurrence is significant in dental blocking techniques. Calculation of the mean distance of this canal with respect to a bony point may have been more beneficial to maxillofacial surgeons. These may be needed for planning graft implants. Knowledge of accessory mental foramina, their position, will be helpful for dental surgeons to achieve complete anaesthesia for any dental procedure. The knowledge will also prevent injury to accessory mental nerve during periapical surgery. **Reference** 

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#### Fig. 1: Medial view of the body of mandible showing accessory foramen







Mental foramen

Fig. 3: Medial view of the body of mandible showing two accessory foramina

