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Case Report

Accessory mental foramen: A peerless anatomical entity

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ABSTRACT

The accessory mental foramen is an uncommon phenomenon with anatomical significance. Additional foramina pattern is a rare occurrence in which only one of the foramen is regarded as the mental foramen and the others as accessory mental foramen (AMF). The emerging patterns of the mental nerve have previously been observed. This case report describes an auxiliary mental foramen that was discovered in a face trauma patient with a mandibular right parasymphysis fracture.

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1. Introduction

The optimum outcome of surgical treatment should be the restoration and improvement of the form and function of the patient without damaging critical anatomical features. The mental nerve, inferior alveolar nerve, and infraorbital nerve are a few of the numerous anatomical neurovascular structures we encounter during maxillofacial treatments. Identification and preservation of these crucial structures during the treatment of maxillofacial injuries is part of the acknowledged goal, albeit being tough. Thus, it is crucial to have a thorough awareness of the anatomy of the key structures.¹

During mandibular surgical treatments, the mental foramen is a crucial anatomic component that needs to be recognized and protected. Mental Foramen begins to form at 12 weeks of gestational period.² Below the apex of the 1st and 2nd premolars on either side of the jaw, a single mental foramen is often present. This foramen houses a neurovascular bundle by the same name.³ H. A. Balcioglu et al. proposed that the accessory mental foramen (AMF)

is formed as a result of the mental nerve splitting from the inferior alveolar nerve before it exits the mental foramen.²

The mental nerve emerges in four different ways: anteriorly, posteriorly, right-angled, and through several foramina. One of these is the unusual multiple foramina pattern, where only one of the foramen is known as the mental foramen and the others are known as accessory mental foramens (AMF).⁴

The present case reports a case of mental foramen and AMF'S which were clinically visible during the maxillofacial procedure.

2. Case Report

A 28-year-old male presented to the emergency department with history of trauma. The patient had no relevant medical history. On clinical examination, patient was diagnosed with right zygomatico-maxillary complex fracture and right mandibular para-symphysis fracture. There was no presence of paraesthesia in right side of lower lip. A fracture line was seen between 42 and 43 running posteriorly towards the inferior border of mandible on Ortho-pantomograph, which also revealed the presence of mental foramen and an accessory mental foramen distal to the fracture line.

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The fracture fragments were mobile and displaced. Patient was planned for open reduction and internal fixation through intra-oral approach. Under general anaesthesia, a vestibular incision was made extending from 41 to 46 regions and full thickness muco-periosteal flap was raised. Mental foramen was identified at the apex of first premolar from which mental nerve was identified. Distal to mental foramen, at the apex of second premolar, a separate foramen- the accessory mental foramen was identified from where accessory mental nerve emerged. Interconnecting branch between the mental nerve and accessory mental nerve was visualized. Mental nerve and accessory mental nerve were carefully skeletonized. The fractured bones were anatomically reduced and fixed with mini plates. Healing was adequate and no post-operative paraesthesia was elicited on follow up.



Fig. 1: Pre-operative 3D CT Scan shows two mental foramina which can be seen in the perpendicular line periapical to 1st and 2nd premolar

3. Discussion

Anatomical variations are present in the mandible related to neurovascular bundle and foramina. The presence of these variations are very rare but they are needed to be identified for proper surgical management.

The accessory mental nerve, a branch of the inferior alveolar nerve, emerges through various foramina in the mandibular canal. In present case an accessory mental nerve was seen on pre-operative radiographs (CT scan and Orthopantomogram), and its presence was verified intraoperative. The pre-operative evaluation included CT scans and an orthopantomogram (Figures 1 and 2), which



Fig. 2: Pre-operative Orthopantomogram (OPG) reveals two mental foramina (arrow pointing) distal to the fracture line in the perpendicular line periapical to 1st and 2nd premolar



Fig. 3: Intra operative picture shows mental nerve and accessory mental nerve and distal to fracture line

revealed the presence of one anatomical mental foramina apical to the first premolar and an accessory mental foramina apically to the second premolar. The presence of an auxiliary mental nerve complicates maxillofacial surgery because retraction and preservation of the accessory nerve, as well as reduction of fragmented pieces during surgery, are critical for preventing post-operative complications such as paraesthesia.

An understanding of the regional anatomy is essential in the treatment planning procedure. Clinical examinations and diagnostic imaging do not always ensure that all morphological entities in a given location are recognized. During surgical intervention, it is difficult to identify and handle anatomic structures.

Tebo and Telford,⁵ 1950 defined the location of the mental foramen in reference to mandibular teeth as follows:

1. The foramen that ran along a long axis between the canine and the first premolar.
2. The foramen located on the first premolar's long axis.
3. The foramen that ran along the long axis between the 1st and 2nd premolar.

4. The foramen located on the second premolar's long axis.
5. The foramen that ran along the long axis between the 2nd premolar and the 1st molar.
6. The foramen that runs along the long axis of the 1st molar.

According to a study conducted by K. Udhaya et al. in 2013 in 90 dried adult human mandible, it was inferred that the mental nerve was located along the long axis of the second premolar more commonly, followed by position between the second premolar and the first molar, and finally position between the 1st and 2nd premolars and the along the long axis of the premolar.⁶

The foramen was detected along the long axis of the first premolar in the present case (Figure 3), and the accessory mental foramen was found along the long axis of the second premolar, distal to the fracture line, with obvious division of the mental nerve. It was also possible to see the connection between the branch of mental nerve and the accessory mental nerve.

According to K. Udhaya et al., The mean length between the foramen and the symphysis mentis is around 25.29 ± 2.29 mm on the left side and approximately 25.79 ± 1.78mm on the right side.⁶ This distance was determined at 26.7 mm on the right side in the current clinical situation.

According to a study by Rajani Singh and A K Srivastava in 2010, it concluded that the prevalent form of the mental foramen is round bilaterally and oval in only a small percentage of the population sample. The mean dimension of the mental foramen was 2.79 mm on the right side, 2.57 mm on the left side, and accessory mental foramen measures about 1.00 mm, with a range of 0.5 mm to 4.00 mm. The presence of accessory mental foramina on the left or right side of the jaw did not differ substantially.⁷

In the current clinical case report, the accessory mental foramen has been located on the right side of mandible at the longitudinal axis of first and second premolar, distal to fracture line. Interconnection was seen between the branches of mental nerve and accessory mental nerve. The accessory mental foramen was found 4.8mm away from the mental foramen. The dimensions of the mental foramen and accessory mental foramen were 2.79 mm and 1.2 mm respectively.

According to Gershenson et al., the prevalence of AMF in adult mandibles is greatest in Negros and Maoris, 2.8% in Israelis, 1.8% in American whites, and 12.5% in Polynesians.⁸ According to Sumit Gupta et al., the incidence of accessory mental foramen is 6.6% in the Indian population.⁹ Injuries to the mental or accessory mental nerves during surgical operations might result in post-operative anesthesia or paraesthesia.¹⁰

4. Conclusion

Accessory mental nerve and its branches require careful identification, dissection and preservation to preventing

damage of the nerve intra-operatively and to avoid post-operative complications especially paraesthesia.¹⁰

Anatomical variations of the mental nerve influence the diagnosis as well as treatment planning, and eventually the management in mandibular surgeries and therefore, documentation and knowledge of such variations is a must.

5. Source of Funding

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6. Conflicts of Interest

No conflicts of interest.

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