



Fenestration of the Mandibular Buccal Cortex by the Inferior Alveolar Bundle: A Case Report

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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Case Study

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ABSTRACT

A precise knowledge of the anatomy of the Mandibular Canal is essential while performing oral surgical procedures in order to avoid any risk of injury to the inferior alveolar neurovascular bundle. The presence of anatomical variations associated with the mandibular canal has great clinical implications during such surgical procedures.

Various anatomical variations may not be well appreciated entirely in two-dimensional images like Orthopantomograph (OPG). In such cases, Cone Beam Computed Tomography (CBCT) plays a crucial role in facilitating the localization of anatomic structures, their significant variations and provides data concerning bone morphology.

In this case report, A 27 year old male patient reported with the chief complaint of intermittent pain in left lower back region of the mouth. Clinical and radiographic examination (OPG) revealed impacted lower third molar in the left back region of the jaw. While raising a full thickness mucoperiosteal flap, we encountered fenestration of the left mandibular buccal cortex by the inferior alveolar nerve which is a 6th reported case without pathology.

The aim of this article is to add on a rare anatomical variation in the existing literature i.e. fenestration of the mandibular buccal cortex by the inferior alveolar bundle, encountered accidentally

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during exposing mandibular third molar and confirmed by cone beam computed tomography (CBCT).

Keywords: Buccal fenestration; Inferior alveolar nerve; Buccal cortex.

1. INTRODUCTION

Anatomical variations are often encountered in different parts of the body. Some of them have been described extensively in the literature and few of them are still being reported. The variations are discovered in the structure, origin, insertion, branching pattern and position of blood vessel, innervation of the muscle and in the different aspects in the anatomy of the bones. The mandibular canal present bilaterally and it starts from the ramus of the mandible through mandibular foramen. It runs obliquely downwards and forward and enters in body of mandible then it runs horizontally and ends at the mental foramen [1]. The main content of the mandibular canal are inferior alveolar nerves and vessels [2]. The mandibular canal is vulnerable during many surgical procedures involving the mandible such as orthognathic surgeries, endosseous implant placement, impacted third molar removal, pathology removal in mandible and various other mandible reconstructive procedures [3]. Sometimes variations in the anatomy of the mandibular canal may be present in the form of duplication, bifurcation or even trifurcation. In Orthopantomograph (OPG) and Intraoral periapical radiographs (IOPA), mandibular canal is usually detected but its anatomical variations are difficult to be depicted entirely in these

radiographs. Cone beam computed tomography (CBCT) can be helpful for the clinician in such cases to easily identify the whole trajectory of mandibular canal and its variations [4]. It is important to recognize these anatomical variations and their presence as most of the time they might be overlooked in clinical management. In this paper we are reporting a case in which a buccal fenestration of the mandibular buccal cortex by the inferior alveolar bundle is observed in relation to left lower second molar.

2. PRESENTATION OF CASE

A 27 year old male patient reported to the Department of Oral and Maxillofacial Surgery with the chief complaint of intermittent pain in lower left back region of the mouth since 1 ½ years. Pain was dull, intermittent, localized and relieved on taking medication. Extraoral examination revealed symmetry of the face bilaterally. Intraoral examination revealed impacted lower third molar in the left back region of the jaw. Patients medical and dental history was nonsignificant. After detailed history and clinical examination the patient was sent for an OPG which showed mesioangular Class II position A impacted third molar in the third quadrant of jaw (Fig. 1).



Fig. 1. OPG showing mesioangular Class II position A impacted third molar in the third quadrant of jaw



Fig. 2. Clinical photograph of the Modified Ward's incision for exposure of the impacted tooth

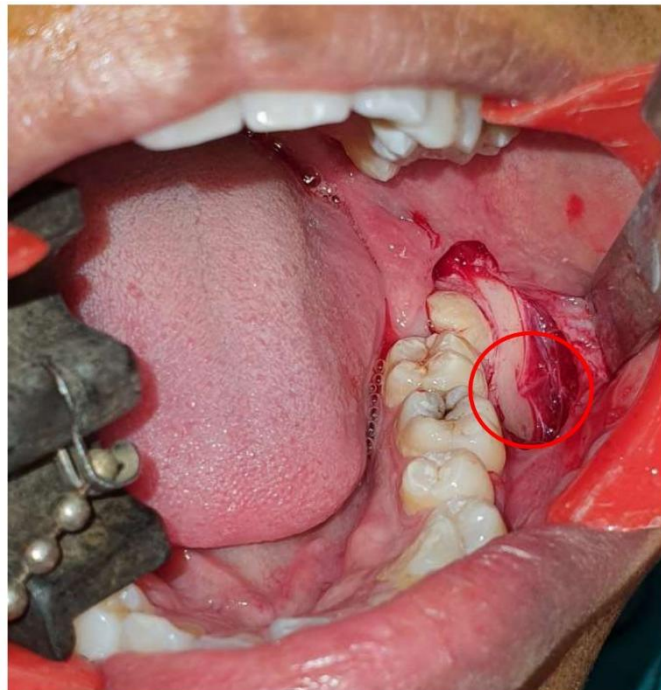


Fig. 3. Clinical photograph of fenestration of the left mandibular buccal cortex by inferior alveolar nerve

Routine blood investigations were done, well informed written consent was taken and patient was advised for surgical extraction of left lower impacted third molar.

Under all aseptic conditions, the area was anaesthetized with 2% lignocaine (1:80,000

concentration with adrenaline). Modified Ward's incision had been given (Fig. 2).

While raising a full thickness mucoperiosteal flap, we encountered fenestration of the left mandibular buccal cortex by inferior alveolar nerve (Fig. 3).



Fig. 4. CBCT showing the anatomical variation of the inferior alveolar nerve

The remaining procedure was performed with utmost care to avoid unnecessary damage to neurovascular bundle. Patient had been informed and a CBCT of the concerned site was taken on 7th postoperative day (at the time of suture removal) of the procedure to precisely locate the course of the inferior alveolar nerve which was not evident in OPG (Fig. 4). Patient was also followed up till 7th post operative day for any alterations in the signs and symptoms for pain or any other sensations and he was not experiencing any paresthesia or anesthesia.

3. DISCUSSION

The presence of anatomical variations associated with mandibular canal has great clinical implication during various surgical procedure involving mandible as it can result in injury to inferior alveolar neurovascular bundle such as traumatic neuroma, paresthesia, anesthesia and hemorrhage [5,6]. Panoramic radiographs (OPG) are most commonly used as a preoperative assessment tool. It is quick, simple, economical, give exposure to low dose and provide enough visibility of anatomical structures and pathological changes of teeth, jaws and temporomandibular joint [7]. But they are having their limitation especially to evaluate the presence and configuration of anatomical variations [8]. Although the real incidence of these variations might be higher than reported. In

the present reported case also we have considered OPG for the pre-operative assessment for the removal of impacted left lower impacted third molar and intraoperatively we encountered buccal fenestration in relation to left lower second molar which was confirmed by CBCT on 7th postoperative day.

A thorough PubMed, Medline, Google Scholar Research was conducted in order to review such cases of fenestration by the inferior alveolar neurovascular bundle. Till now there are five cases (Table 1) of buccal cortex fenestration and one case of lingual cortex fenestration which had been reported in literature.

Out of these five reported cases, one buccal fenestration case is associated with hemifacial macrosomia [9] and one lingual fenestration case is associated with the Stafne bone cavity [10]. Remaining three cases with four anatomical sites were without involving any pathology. So this makes the present case sixth reported case and seventh anatomical site of buccal fenestration by inferior alveolar nerve without any pathology. An imaging technology like CBCT is a fundamental in several areas of dental medicines as it allows the 3D evaluation of the maxillofacial structure [12]. Although panoramic radiography is a gold standard in routine dental practice, importance of CBCT cannot be denied in diagnosis of anatomical variations for accurate planning.

Table 1. Rare cases of buccal fenestrations of cortex by inferior alveolar nerve reported till now in the literature

| Sr No | Author name | Year of publication | Age/ Gender | Location | Imaging modality used |
|--------------|-------------------------|----------------------------|--------------------|---|-------------------------------|
| 1 | Tolentino et al. [8]. | 2013 | 49/F | Right mandibular body | CBCT |
| 2 | Manikandhan et al. [9]. | 2010 | 20/F | Right mandibular ramus | Panoramic radiograph and CBCT |
| 3 | Oliveira et al. [10]. | 2013 | 58/F | Left mandibular body | CBCT |
| 4 | Oliveira et al. [10]. | 2013 | 68/M | Bilateral mandibular Body | Panoramic radiograph and CBCT |
| 5 | Ikuta et al. [11]. | 2016 | 45/F | Buccal right surface of the mandible near the third molar | CBCT |
| 6 | Present case | 2021 | 27/M | Left mandibular body | Panoramic radiograph and CBCT |

4. CONCLUSION

We wish to conclude that CBCT imaging is superior and important in the management of various surgical procedures related to mandible like 3rd molar extraction and various major surgical procedures in mandible.

ETHICAL APPROVAL

As per international standard or university standard written ethical approval has been collected and preserved by the author(s).

CONSENT

Routine blood investigations were done, well informed written consent was taken and patient was advised for surgical extraction of left lower impacted third molar.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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