Acta Scientific Dental Sciences

Volume 1 Issue 1 June 2017

Case Report

Comprehensive Management of Misdiagnosed Periapical Pathology Mimicking the Mental Foramen Using Cone Beam Computed Tomography as a Diagnostic Aid - A Rare Case Report

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Received: May 06, 2017; **Published:** June 28, 2017

Abstract

The clinician should have thorough knowledge of anatomic landmarks and pathological changes to distinguish between normal anatomic structures and pathologic lesions in radiographic interpretation. Among all teeth after third molars, mandibular premolars have earned the reputation of having aberrant root and root canal anatomy. In addition, the position of mental foramen at mandibular premolar region often complicates the diagnosis and could be misdiagnosed as periapical pathology. To treat mandibular premolars predictably associated with such complexity, cone beam computed tomography (CBCT) plays vital role in differentiating between normal hard and soft tissues along with pathologic lesions. This article presents a rare case report of the periapical pathology that mimics the mental foramen in an intact mandibular first premolar diagnosed with pulp necrosis using clinical tests and CBCT.

Keywords: Anatomical Landmarks; CBCT; Mandibular Premolar; Periapical Pathology

Abbreviations

CBCT: Cone Beam Computed Tomography; IOPA: Intra Oral Peri Apical Radiograph; MF: Mental Foramen

Introduction

Cases have been reported in the literature that mimic periapical inflammatory lesion in radiograph such as odontogenic cyst [1], carcinoma [2,3], aberrant salivary gland tissue [4], and periapical cemental dysplasia [5]. Errors in processing of the radiographic film have also been reported that mimic the appearance of periapical infection [6]. Normal anatomic structures such as mental or incisive foramina are known radiolucencies that seem to be overlapped on the root apex of mandibular premolars or maxillary incisors and causing dilemma in the diagnosis of pathologic periradicular lesions. Using advent technology like CBCT, periapical lesions may be detected early when compared to routine periapical radiographs with respect to its true size, extent, nature and position [7]. The case report presents an unusual variation of periapical lesion mimicking mental foramen in a clinically intact mandibular first premolar. The combination of clinical tests, periapical radiographs taken at different angulation and CBCT is useful in drawing an appropriate diagnosis and providing a accurate treatment to the patient.

Case Report

A healthy 27 years old female patient was referred by a private dentist, with a complaint of intermittent pain in mandibular left premolar region since 2 months. Since 3 days she had continuous throbbing pain in the same region pointing towards teeth #34, #35. Previous dentist could not arrive at the diagnosis as tooth was clinically intact with no evidence of discoloration or caries. Periapical lesion in radiograph seen to be associated with tooth #34 was misdiagnosed as a mental foramen due to its close approximation with lesion (Figure 1A, 1B). Tooth #34 has shown tenderness to percussion test with sound periodontal support. Electric pulp testing (EPT) for evaluating the vitality of the tooth #34 showed

no response suggesting the pulp necrosis. Intra oral periapical radiograph (IOPA) of tooth #34 was taken with straight on angulation showed image of two roots and two separate root canals with diffused periapical radiolucency. Another IOPA with mesial angulation confirmed two rooted #34 with two separate root canals and overlapping of the mental foramen with periapical lesion without any clear distinction between the two (Figure 2). To further check the extent of the suspected lesion cone beam computed tomography (CBCT) was advised. CBCT revealed a close approximation of the mental foramen with the periapical radiolucency and buccal cortical plate perforation at the apical third region (Figure 3). Non-surgical endodontic treatment for tooth #34 was planned and informed consent was obtained from the patient.

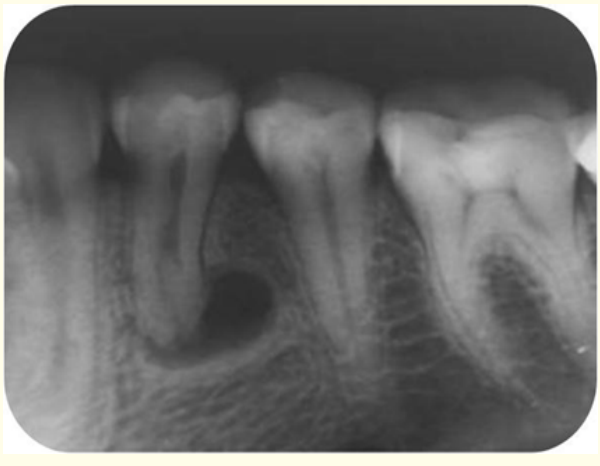

Figure 1A: Preoperative IOPA referred by private practitioner.

Figure 1B: Intra oral photographs of teeth #34 and #35.

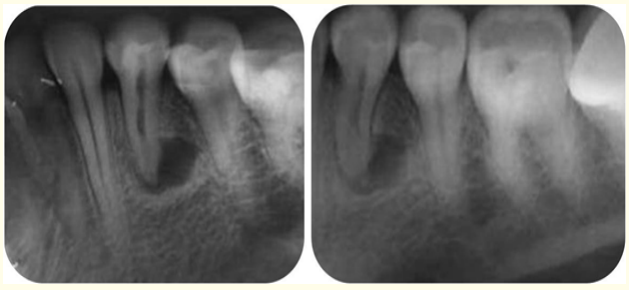

Figure 2: Preoperative radiographs of tooth #34 and #35 with straight on and mesial angulations.

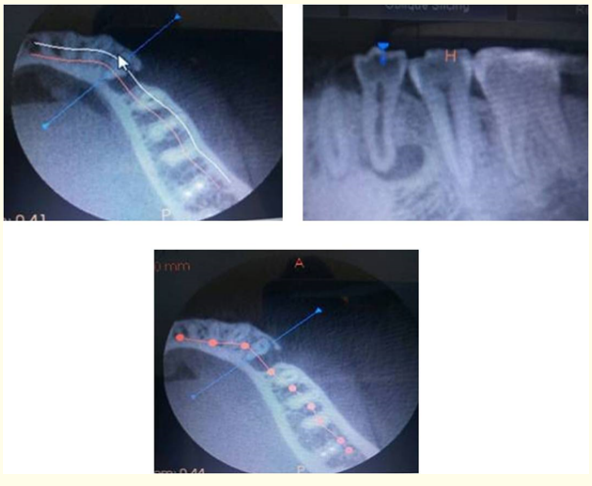

Figure 3: CBCT images showing perforation of buccal cortical plate and periapical lesion overlapping mental foramen.

Local anesthesia was secured and tooth #34 was isolated under rubber dam. Access cavity was prepared in the centre of the occlusal surface; extended buccolingually to locate buccal and lingual canal orifices and to establish straight line access to both canals. Working length was established using radiograph and root canals were prepared with hand files followed by NiTi Protaper Universal rotary files. Root canals were irrigated with 5.25 % of sodium hypochlorite during complete cleaning and shaping procedure. Intracanal calcium hydroxide paste was placed and patient

was recalled after 1 month for evaluation (Figure 4). After 1 month when patient was found to be asymptomatic, intracanal calcium hydroxide was removed. Root canals were finally irrigated with 5.25 % of sodium hypochlorite and canals were dried using Protaper paper points. Obturation was done using AH-plus sealer and Protaper gutta-percha points (Figure 5). Patient was kept under observation and recalled after 1 - 3 months for evaluation.

Figure 4: Immediate (left) and one month follow up (right) post-operative IOPA after intracanal placement of calcium hydroxide of tooth #34.

Figure 5: Immediate post obturation IOPA of tooth #34.

At one month of recall visit patient was clinically asymptomatic. At three months follow up the patient reported with continuous dull pain in tooth #34. Clinically tooth #34 was tender to percussion test. IOPA advised showed no evidence of healing of periapical lesion associated with tooth #34 (Figure 6). Considering the present clinical and radiographic condition, apicectomy with apical curettage followed by bone grafting was advised. Surgery related complications such as pain, bleeding, paresthesia, anaesthesia of surgically operated side were explained to the patient and informed consent was obtained for the surgical phase.

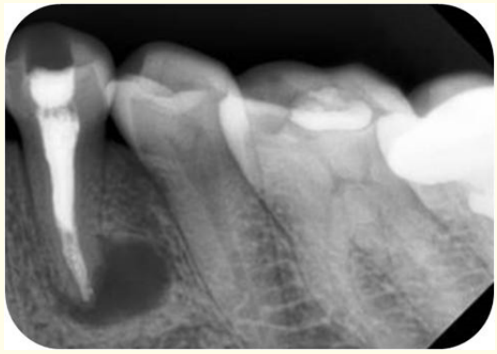

Figure 6: 3-months follow up IOPA of tooth #34.

Patient was pre-medicated with antibiotic (Cap. Amoxicillin 500 mg). Inferior alveolar nerve block anaesthesia was given to secure profound anesthesia of lower left mandibular region. Using 3.5X magnifying loupes, a full thickness periodontal flap was reflected from tooth #33 to tooth # 36 region with sulcular and vertical releasing incisions. Buccal cortical plate perforation was discovered in the apical region of tooth#34. This perforation site was modified carefully to gain access to the lesion. All possible care and precautions were taken for preventing the damage to the mental nerve in the area of operating site by proper retraction. 3mm apical portions of both buccal and lingual roots were resected and removed. The apical bony cavity was then properly cleaned with curette and irrigated with Betadine (povidine iodine solution) antiseptic solution. Apical root end preparations were done with ultrasonics apical end preparation tips and MTA apical plug was carried with MTA carrier and condensed. An apical bony cavity was filled with bone graft material (Figure 7). Periodontal flap was approximated and sutured with nylon sutures and IOPA radiographs were taken (Figure 8). Patient was recalled for evaluation after 24 hours and instructed about post-operative care including oral rinsing with 0.12% chlorhexidine mouthwash. A day after surgery patient reported with slight swelling in operated region without any discomfort, pain or any symptoms of parasthesia or numbness. Patient was advised to continue with antibiotic coverage for 3 more days and recalled after a week for checkup. After a week patient was found to be asymptomatic with no evidence of swelling or discomfort in operated area. Post endodontic silver amalgam restoration was done in tooth #34. The patient

was kept under observation for regular follow up of 6 months. After 6 months recall, patient was asymptomatic and the IOPA showed reduce in size of periapical lesion suggesting healing of the lesion. CBCT scan also exhibit reduction in apical lesion now showing the clear demarcation of mental foramen (Figure 9). Further follow up after 1 year, satisfactory healing of peri-apical lesion was observed in IOPA with no clinical symptoms associated with tooth #34 (Figure 10).

Figure 7: Clinical intra operative photograph showing root end resection with retro filling (left) and bone graft placement in tooth #34.

Figure 8: Immediate post-surgical IOPA with straight on and mesial angulations of teeth #34 and #35.

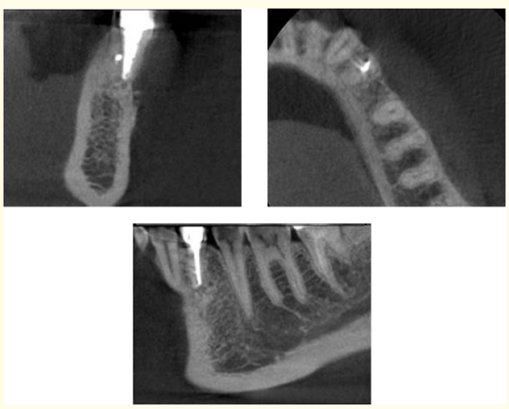

Figure 9: 6-months recall post-operative CBCT scan images of tooth #34.

Figure 10: One year follow up IOPA of tooth #34.

Discussion

Success of root canal treatment depends on number of factors including adequate knowledge of the root and root canal morphology, proper diagnosis of pulpal- periapical disease, thorough cleaning and shaping of root canal space and complete sealing of the root canal space [8]. Mandibular premolar area is the critical site due to presence of mandibular nerve and mental foramen. Mental foramen (MF) is usually located bilaterally on the lateral aspect of the mandible inferiorly to the interproximal region of the first and second premolars [9]. Anatomical position of mental foramen varies among different ethnic groups. In Indian population, the common position of the mental foramen is between mandibular first and second premolars (59.2%) in Northeast Indians whereas in South Indian population the common location is in line with long axis of the mandibular second premolars (68%) [10]. In radiographic examination MF presents as a single circular or elliptical radiolucent area occurred bilaterally in the periapical region of mandibular premolars [11]. Phillips., *et al*. in his study discovered that the mental foramen is visible on 75% of the horizontal periapical radiographs [12]. The other studies confirmed that the position of the mental foramen is usually mesial and below the radiographic apex, or in line with the longitudinal axis of the mandibular second premolar [12,13]. This radiographic appearance may result in a misdiagnosis or misinterpretation of a radiolucent lesion in the apical area of mandibular premolar teeth [14]. IOPA have certain limitations including anatomical noise, two-dimensionality and geometric distortion [15]. Advance three-dimensional imaging technology, such as cone beam computed tomography (CBCT) was applied for dental imaging to overcome the limitations of periapical radiographic images by eliminating the superimposition of anatomical structures and improving the observation of bone structures and their relationship with adjacent

anatomical landmarks [15]. CBCT has been established as a valuable imaging modality capable of providing in-depth information about maxillofacial structures, allowing detailed evaluation of their topography and anatomical variations [9].

In the presented case, periapical radiograph with straight on and mesial angulation were taken that showed two rooted #34 with two separate root canals and overlapping of the mental foramen with diffused periapical lesion and there was no differentiation between the two. Cone beam computed tomography (CBCT) was advised which revealed a close association of the mental foramen with periapical radiolucency along with the buccal cortical plate perforation at apical third region. The complex anatomy of the teeth, their surrounding structures as well as various pathological patterns may render diagnostic procedures and treatment monitoring difficult [16]. Therefore, clinicians must be well trained to identify normal anatomical landmarks and variations due to such pathology [8].

Conclusion

This case emphasizes the need for careful consideration of periapical radiolucency before making a prompt diagnosis and to identify a poorly recognized anatomical feature which may cause diagnostic dilemma. The appearance of the lesion may have led the patient to receive inappropriate treatment and no relief from the pathology. Certain radiological features such as large lesion size, relationship to an impacted tooth or the mandibular canal, tooth resorption, as well as ill-defined lesion borders, require further radiological work-up. CBCT provides additional help in identifying the lesion especially when true the nature of the lesion is unclear and lesion is in the vital area of artery or nerve vicinity. Majority of periapical pathology originating from pulp diseases have a good potential for healing after appropriate endodontic treatment but lesion in vicinity of nerve might cause paresthesia. In our case lesion healed with non-surgical endodontic treatment followed by periapical surgery. Complications such as paresthesia or anaesthesia of operated area have been prevented by careful preoperative examination, good quality radiographs and careful retraction of mental nerve. A high-resolution 3D technique such as CBCT has proven to be of great value in periapical problems whenever there is diagnostic dilemma as in our case.

Conflict of Interest

No conflict of interest.

Bibliography

1. Hancock M A., *et al*. "Orthokeratinised odontogenic cyst presenting as a periapical lesion". *Journal of Endodontics* 12 (1986): 539-541.

2. Nevins A., *et al*. "Metastatic carcinoma of the mandible mimicking periapical lesion of endodontic origin". *Endodontics and Dental Traumatology* 4.5 (1988): 238-239.

3. Cutler R. "Neoplasia masquerading as periapical infection". *British Dental Journal* 168.7 (1990): 348-349.

4. Anneroth G., *et al*. "Intraosseous salivary gland tissue of the mandible mimicking a periapical lesion". *International Journal of Oral and Maxillofacial Surgery* 19.2 (1990): 74-75.

5. Smith S., *et al*. "Periapical cemental dysplasia: a case of misdiagnosis". *British Dental Journal* 185.3 (1998): 122-123.

6. Horner K. "Film fault artefact mimicking a periapical radiolucency". *British Dental Journal* 165.1 (1988): 21-22.

7. Shanon Patel. "New dimensions in endodontic imaging: Part 2. Cone beam computed tomography". *International Endodontic Journal* 42.6 (2009): 463-475.

8. Fava LR and Dummer PM. "Periapical radiographic techniques during endodontic diagnosis and treatment". *International Endodontic Journal* 30.4 (1997): 250-261.

9. Neves FS., *et al*. "Case Report". *Revista de Pós-Graduação* 17.3 (2010): 173-176.

10. Kumar V., *et al*. "Radiographic localization of mental foramen in Northeast and South Indian ethnic groups of Indian population". *Journal of Contemporary Dental Practice* 15.6 (2014): 766-769.

11. Greenstein G and Tarnow D. "The mental foramen and nerve: clinical and anatomical factors related to dental implant placement: a literature review". *Journal of Periodontology* 77.12 (2006): 1933-1943.

12. Phillips JL., *et al*. "The mental foramen: 2. Radiographic position in relation to the mandibular second premolar". *Journal of Endodontics* 18.6 (1992): 271-274.

13. Ngeow WC and Yuzawati Y. "The location of the mental foramen in a selected Malay population". *Journal of Oral Science* 45 (2003): 171-175.

14. Phillips JL., *et al*. "The mental foramen: 1. Size, orientation, and positional relationship to the mandibular second premo-

lar". *Journal of Endodontics* 16.6 (1990): 221-223.

15. Abella F., *et al*. "An evaluation of the periapical status of teeth with necrotic pulps using periapical radiography and cone-beam computed tomography". *International Endodontic Journal* 47.4 (2014): 387-396.

16. Gröndahl H and Huumonen S. "Radiographic manifestations of periapical inflammatory lesions". *Endodontic Topics* 8 (2004): 55-67.

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