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CBCT an Eagle's Eye to Dentist: - Case Report on Diagnosis of Crack Tooth Syndrome

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Abstract

AIM: This article emphasize on timely use of cone beam computed tomography as an aid in diagnosis and as a prognostic determinant.

Summary: Cracked tooth is a distinct type of longitudinal fracture of tooth whose diagnosis is difficult and challenging. It may extend through one or both of the marginal ridges and through the proximal surface. It is the third leading cause for tooth loss after caries and periodontal disease and is caused by occlusal forces, either large forces on a normal tooth or normal force on a weakened tooth. It can act as a pathway for ingress of bacteria that may induce pulpal and periapical inflammation or disease. Early diagnosis followed by proper treatment planning and periodic follow up evaluation is the goal standard protocols in treating cracks.

Key learning points

- 3rd leading cause
- Accurate diagnosis and appropriate treatment of crack tooth is complicated due to lack of awareness of this condition and its bizarre clinical features.
- Early recognition and treatment is the key for proper management of cracked tooth and preservation of tooth for function.
- Main cause of crack tooth syndrome is occlusal forces either large forces on a normal tooth or normal force on a weakened tooth.

- Fracture in cracked tooth is not visible radiographically as it is in mesiodistal direction, so timely use of CBCT is good aid in diagnosis and as prognostic determinant.

Keywords: Cracked tooth, CBCT, Split tooth, Vertical root fracture

Introduction

The term cracked tooth syndrome was described by Dr. Cameron in 1964 and this term is misleading as there is no distinct and reliable pattern of symptoms in crack tooth syndrome. [1] This is the third leading cause for tooth loss after caries and periodontal disease.[2] The incidence of crack tooth has been increased during past decade which may be due to increase in awareness among dentists.[3] It's a major diagnostic challenge in clinical practice**.** Cracked tooth is defined as distinct type of longitudinal fracture which may extend through one or both of the marginal ridges (through the proximal surface).[4] When a tooth fracture is incomplete, the presentation is more subtle and frequently remains undiagnosed because signs and symptoms are often confusing and are not sufficiently recognized by clinicians.

Cracks may initiate from coronal tooth structure or from within the root and affect healthy or root canal treated teeth.[1] It is caused by occlusal forces, either large forces on a normal tooth or normal force on a weakened tooth. Complex restorative procedures and root canal treatment that removes excess dentin, compromise the internal strength of the tooth making it more susceptible to fracture .[5]

The American Association of Endodontists has classified five specific variations of cracked teeth:-[

- Craze lines
- Fractured cusp
- Cracked tooth
- Split tooth
- Vertical root fracture

Symptoms will vary with teeth that have healthy pulps, for teeth with inflamed or necrotic pulps and for teeth that have been root canal treated. The classic symptoms of crack tooth syndrome include sharp pain on release of pressure referred as rebound pain and additionally sensitive to cold which may be due to the alternative stretching and compression of the odontoblastic processes located within the crack. Cracked tooth by itself is not a diagnosis, but is a clinical finding.[5] The main objective is to first detect and then determine extent of fracture. The deeper the fracture extends on to root surface poorer the prognosis.

Fracture in cracked tooth is not visible radiographically because it is in Mesiodistal direction. Useful aids in detection are trans illumination, selective biting on objects such as the tooth sloth, dental operating microscopes, staining, wedging forces, careful visualization after removal of restoration.[4] Though in the initial stages, a cracked tooth may not present any symptoms except for a crack, which may or may not be visible either in naked eye, magnification, transillumination, etc. If left untreated, a cracked tooth can become a split tooth and have a hopeless prognosis and may have to be extracted.[3] It can act as pathway for bacteria that may induce pulpal and periapical inflammation or disease. The endodontic diagnosis and treatment plan entirely depends upon extent of fracture.[5] Early recognition by recent diagnostic aids like CBCT is the key for proper management of cracked tooth and preservation of tooth for function.

Case Report

Case 1: A 44 year old female patient reported to the Department of Conservative Dentistry and Endodontics with chief complaint of pain on chewing in upper left back tooth region which lingered on for few hours after the removal of stimulus. She also gave history of visit to

general practitioner some days ago. On clinical examination there was neither caries present nor any restoration. Tooth was non-tender to percussion and did not exhibit any mobility. EPT revealed immediate response. Radiographic examination revealed no significant findings as shown in "Fig. 1". When accurate diagnosis can't be made, patient was given choice of CBCT examination to find exact cause. After the consent from the patient she was referred for CBCT evaluation which revealed thin linear cracked line in coronal part of 27 tooth along the mesiodistal tooth surface which was extending to the pulp but cracked line was not extended below the CEJ of tooth (Fig. 2, 3). On examination no other cracked line was seen in any other maxillary and mandibular posterior teeth and no periapical pathology was seen. As cracked line was not extended below the CEJ of tooth it favours the prognosis seen in "Fig. 4". Based on the history, clinical presentation and CBCT evaluation root canal treatment followed by crown w.r.t 26 was planned.

Case 2: A 70 year old female patient had reported to the Department of Conservative Dentistry and Endodontics with chief complaint of pain on chewing in lower left back teeth region which lingered on few hours after the removal of stimulus. Patient gave dental history of extraction w.r.t 37, 38 and root canal treatment w.r.t 36. On clinical examination fixed prosthesis was present on tooth 36 and tooth was tender to percussion. Radiographic examination revealed periapical lesion w.r.t 36. Also to confirm the prognosis of tooth CBCT examination was suggested to patient. After the consent from patient, CBCT evaluation revealed linear cracked margin along the mesial root t of 36 in furcation area as well as in mesial root surface along with complete buccal bone loss is seen in "Fig.5 to Fig.8". Also hyperdense filling is seen in root canal which may be the cause of cracked tooth as shown in "Fig 7 and Fig 8". All the findings were suggestive of cracked tooth with chronic inflammatory pathology w.r.t 36. Prognosis was considered to be poor. So, following the CBCT finding extraction of 36 was planned.

Discussion

34%-74% of incidence has been documented for crack tooth [6] whereas dental fractures account for 26-76% of incidence in the permanent dentition. Dental trauma and associated fracture of tooth often has severe impact on the psychological wellbeing of a patient.[1] Crack tooth is not only associated with complex and long standing restorations but also with minimally restored tooth and tooth without any restorations.

Luebke found prevalence of mandibular molars especially the distolingual cusp most susceptible to cracking. The maxillary molars and premolars have similar incidence of fracture, with the mandibular premolars being the least susceptible to cracking as the stresses during mastication is minimal on these teeth.[4] This may be due to the larger masticatory forces on the tooth.

High incidence of cracks has been reported in heavily restored teeth, unrestored teeth, teeth with untreated carious lesions and parafunctional habits.[3] Longitudinal fractures are common in root canal treated teeth, as the strength of root canal treated teeth is compromised by caries, restorations, or overextended access preparations making it vulnerable to fracture.[4]

Due to variable and bizarre clinical signs and symptoms, cracked tooth syndrome is a diagnostic challenge for even the most experienced dental operators. The importance of an early diagnosis has been linked with successful restorative management and prognosis.[6]

As the fracture in a cracked tooth is usually present in mesiodistal direction, it is not visible radiographically since x-ray photons passing through a radiolucent fracture plane also pass through extensive amounts of radiopaque

healthy tooth structure. Newer methods of analysis, such as CBCT, are currently being studied in order to help, identify longitudinal fractures in a nondestructive fashion. As these advanced methods like CBCT along with timely treatment can limit the crack propagation.

Mora et al conducted an in vitro study and found local CT and CBCT to be more efficient in detection of longitudinal tooth fractures compared to conventional dental radiographs. All radiographic examinations must be justified on an individual basis whereby the benefits to the patient of each exposure must outweigh the risks. In no case may the exposure of patients to x-rays be considered "routine" and certainly CBCT examinations should not be done without initially obtaining a thorough medical history and clinical examination. CBCT should be considered an adjunct to two-dimensional imaging in dentistry.[4]

In a tooth exhibiting CTS, the first line of treatment is to splint and stabilize a cracked tooth using an orthodontic band, copper ring or full coverage acrylic provisional crowns thereby preventing further extension or complete fracture of the tooth. This is followed by reinforcement of the crack using flowable composites or GIC.[5] If crack is extensive involving pulp, Crowns are given in posterior teeth after endodontic therapy which provides bracing effect and prevents crack from propagating further.[3,4]

Conclusion

Early detection, diagnosis and prompt treatment are keys to successful management of a cracked tooth. Advanced methods like CBCT along with timely treatment can limit the crack propagation and help saving the tooth.

References

1. Chowdhury D, Samanta S, Roy M, Desai P, Das UK, 'Endodontic management of molar cuspal fracture: case series', International journal of current research, vol. 10, no.1, 2018, p. 67848-67853.
2. Cracked Teeth: A more serious problem in 2018 than 1964, Dentistry IQ, no.16367380, 2018, p.1-3.
3. Geethapriya N, Subbiya A, Mitthra S, Vivekanandhan P, 'Management of Cracked Teeth: A Report of Two Cases', J Oper Dent Endod, vol. 3, no.1, 2018, p. 48-51.
4. Kalyan Chakravarthy PV, Telang LA, Nerali J, Telang A,' Cracked tooth: a report of two cases and role of cone beam computed tomography in diagnosis', Case Reports in dentistry, 2012. Doi:10.1155/2012/525364.
5. George G, Rejitha K, Vedavathi B, Ranjini M A, Neeharika G, 'Management of cracked teeth". International Journal of Current Research', vol. 9, no. 6, 2017, p. 51899- 51902.
6. Hasan S, Singh K , Salati N, ' Cracked tooth syndrome: Overview of literature', International Journal of Applied and Basic Medical Research, vol. 5, no. 3, 2015, p. 164-168.

Legend Figures

Figure 1

Figure 2

Figure 3

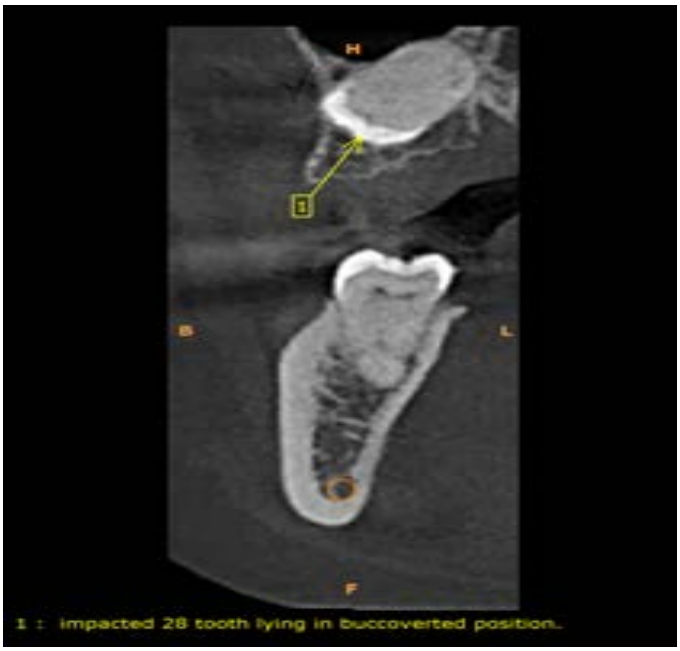

Figure 4

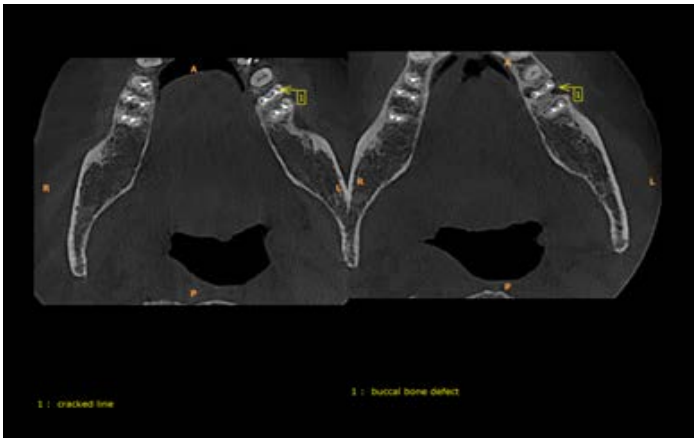

Figure 5

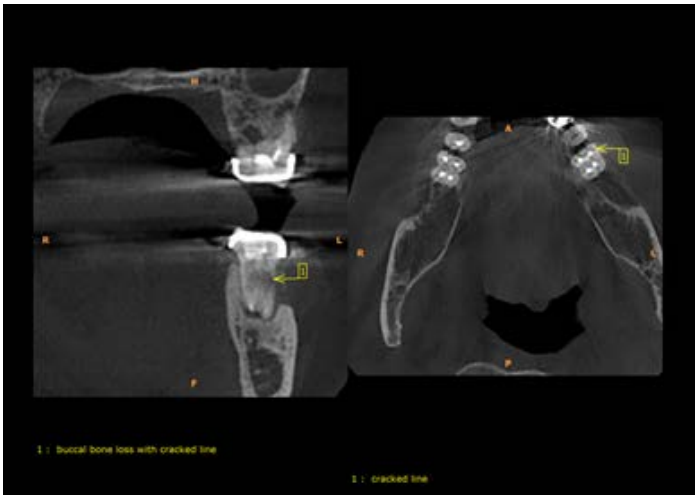

Figure 6

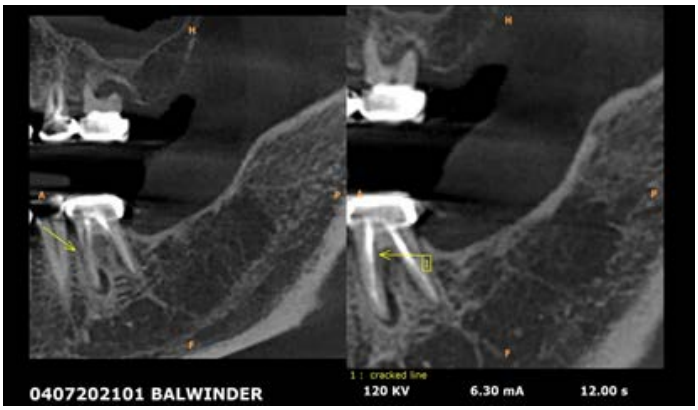

Figure 7

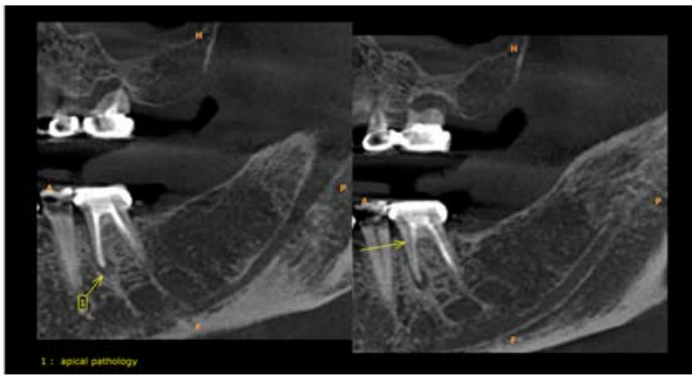

Figure 8