



ORIGINAL RESEARCH PAPER

Medical Science

MANAGEMENT OF ENDODONTIC MISHAP IN MAXILLARY CENTRAL INCISOR BY CONE-BEAM COMPUTED TOMOGRAPHY- A CASE REPORT.

KEY WORDS: Ledge, CBCT, Diagnosis

Dr. Leneena Gudugunta	Lecturer, Faculty of Dentistry, Aimst University, Kedah ,Malaysia.
Dr. Bhavana Vankayala*	Asst. Professor, Department of Conservative dentistry and Endodontics, Government Dental college and hospital, Hyderabad, Telangana, India. *Corresponding Author
Dr. Jeevan Matada Basavarajaiah	Associate professor, Faculty of dentistry, AIMST University, Kedah, Malaysia.
Dr. K.Swetha	Senior lecturer, Department of Conservative dentistry and Endodontics, Mallareddy Dental college for Women, Hyderabad, Telangana, India.
Dr. Sathiyavathi Mahendra Kumar	Lecturer, Department of Pedodontics, Faculty of Dentistry, Aimst University, Kedah, Malaysia.
Dr. Kalambur Perumal Lavanya Priya	Lecturer, Department of Conservative dentistry and Endodontics, Faculty of Dentistry, Aimst University, Kedah, Malaysia.

ABSTRACT

Endodontic mishaps are unfortunate occurrences which may take place during treatment, one of which is ledge formation. The best method to manage ledges is its prevention. Recognition of ledge is the first step in management, either by clinical or radiographical observation. This case report brings into light the importance of CBCT imaging in proper diagnosis of the endodontic mishap which further led to accurate management of the condition.

Introduction:

Deviation from the original canal curvature without communication with the periodontal ligament results in procedural error known as ledge formation. This often results when the clinician works the files short of the full canal length, thus canal becomes blocked at that "short point", which might create a ledge, or formation of a new pathway at a tangent to the true pathway of the root canal.¹ This can result in incomplete instrumentation, disinfection and filling of the root canal. Ledges frequently result in ongoing periapical pathosis after the endodontic treatment. Consequently, unfavourable endodontic treatment outcomes.² Recently, cone beam computed tomography (CBCT) has been introduced which provides clinician the ability to view an area in three different planes and to gain three-dimensional information. Combination of coronal, sagittal and axial views in CBCT images eliminates the superimposition of anatomic structures.^{3,4} It helps in visualization of root morphology, the number of root canals and their convergence or divergence from each other.⁵ This case report suggests how the CBCT imaging is useful in accurate diagnosis of endodontic defect and further treatment planning.

Case Report:

A 21 years old female patient came to the department of conservative dentistry and endodontics with a chief complaint of pain in the upper front tooth since one month, and gave a history of previous root canal treatment one year ago. On clinical revealed discoloured maxillary left central incisor. Radiographical (Intra oral periapical) findings showed incomplete under obturated root canal. (Figure 1) The tooth was tender on percussion and medical history was non-contributory. Clinically a restored buccal defect and buccal bone loss was evident. Hence the patient was sent for three-dimensional cone beam tomography (CBCT) which revealed a ledge formation extending buccally through its sagittal section

(Figure 2) and this defect was filled with the obturating material leaving the actual lingually placed root canal untouched, which was seen in the axial cross-sectional CBCT view. (Figure 3) After studying the case thoroughly, root canal re-treatment was planned. The Gutta-percha was removed from the ledge defect, access was made to the actual root canal placed lingually with 10 size K-files, and after completion of Biomechanical preparation with Hyflex CM rotary files up to 40 size 4% instrument, the ledge defect was sealed with MTA and obturation was done by warm vertical condensation. (Figure 4)

Discussion:

It would be of great value if clinicians were able to correct a ledge. The ledge correction may be achieved in one of several ways depending on the extent of the procedural accident.⁶ Renegotiating and relocating the original canal and removing or bypassing it might be difficult. In some instances, lateral perforations might occur when the ledge is created during initial instrumentation or as a "strip perforation" on the of the root canal wall and less likelihood of ledge formation occurring.⁷ In this case report, the pre-operative IOPA radiograph showed only a two-dimensional view of an under-obturated root canal but didn't show the actual ledge formed within the root canal. The ledge was identified only after the CBCT imaging through which accurate diagnosis and treatment planning was planned. This may prompt a re-assessment of the very strict criteria currently applied to the radiographic evaluation of endodontic treatment success, which to date has been based on conventional imaging, and use of CBCT imaging in appropriate diagnosis and treatment planning of the endodontic mishaps has been proved.⁸

Conclusion:

This case report highlights the potential uses of CBCT in the assessment and management of endodontic problems. This three-

dimensional imaging technique overcomes the limitations of conventional radiography and is a benefits accurate diagnosis and treatment planning of the endodontic procedural errors.



Figure 1: Pre-operative radiograph

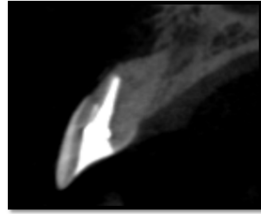


Figure 2: CBCT Sagittal View

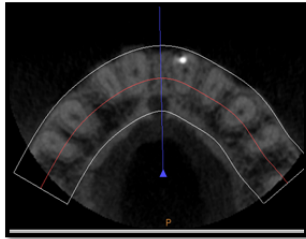


Figure 3: CBCT Axial cross-sectional view



Figure 4: Post-operative radiograph

REFERENCES:

1. Hamid Jafarzadeh and Paul V. Abbott. Ledge Formation: Review of a great challenge in endodontics. JOE 2007;33(10):1155-62.
2. Kapalas A, Lambrianidis T. Factors associated with root canal ledging during instrumentation. Endod Dent Traumatol 2000;16:229-31.
3. Mohsen Aminsobhani, Mona Sadegh, et al. Evaluation of the Root and Canal Morphology of Mandibular Permanent Anterior Teeth in an Iranian Population by Cone-Beam Computed Tomography. Journal of Dentistry, Tehran University of Medical Sciences, Tehran, Iran 2013;10(4):158-67.
4. Conor Durack, Shanon Patel. Cone Beam Computed Tomography in Endodontics. Braz Dent J 2012;23(3):179-91.
5. Patel S, Dawood A, Whaites E, Pitt Ford T. New dimensions in endodontic imaging: Part 1. Conventional and alternative radiographic systems. Int Endod J 2009;42:447-462.
6. Nagy CD, Bartha K, Bernath M, Verdes E, Szabo J. The effect of root canal morphology on canal shape following instrumentation using different techniques. Int Endod J 1997;30:133-40.
7. Greene KJ, Krell KV. Clinical factors associated with ledged canals in maxillary and mandibular molars. Oral Surg Oral Med Oral Pathol 1990;70:490-7.
8. Cotti E, Campisi G. Advanced radiographic techniques for the detection of lesions in bone. Endod Topics 2004;7:52-72.