Management of Discolored Teeth With A Blunderbuss Canal - A Case Report

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Abstract
Achieving a 3- dimensional seal of the root canal is an important factor affecting success in endodontic treatment. Trauma to young permanent tooth in the anterior region of jaw is not uncommomn. This hampers the root development of teeth, in immature root formation leading to an open apex. Patients presenting such teeth pose a special challenge to endodontist and requires a specially designed treatment plan. The following case report highlights the management of an anterior tooth with an open apex with apexification procedure by formation of an apical plug with BIODENTINE™ (Septodont).
Keywords: open apex, apexification, BIODENTINE™, MTA, blunderbuss

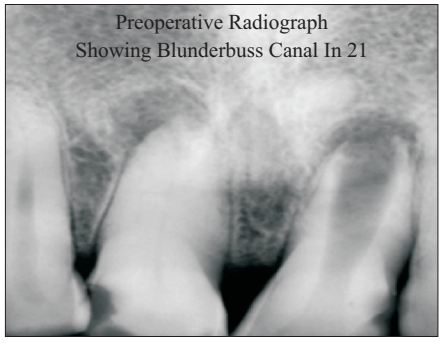
Introduction

A lot of studies and research is devoted in studying the root apex of the tooth for predictable and successful endodontic treatment. Complete asepsis and 3- dimensional obturation is of utmost importance to achieve successful root canal treatment. While most endodontic treatment can be managed comfortably there are patients that defy predictable root canal treatment. One of this is group of patients having incomplete root development with an open apex. Slightly convergent, parallel, or divergent canal walls with open apex pose a challenge to endodontics.[1] Trauma during the root formation stage is the major cause of open apex. Apexification is a procedure to promote the formation of an apical barrier to close the open apex of an immature tooth with a nonvital pulp such that the filling materials can be contained within the root canal space.[2] Various materials can be used such as calcium hydroxide, GIC, Resorbable ceramics, surgical/amalgam, Freezed-dried bone,or dentine, MTA, BIODENTINE, tricalcium phosphate.[3] This manuscript reports a case describing management of a blunderbuss canal in the upper central incisor by apexification with BIODENTINE (SEPTODONT)™

Case Report

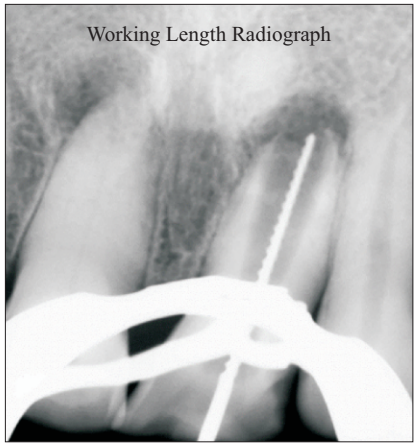
A female patient age 35 years, resident of Mumbai came to the department of conservative and endodontics of Padamshree. Dr. D. Y. Patil Dental college and hospital with a chief complaint of dull pain and swelling in upper front teeth since 1 month. She had a medical history of high blood pressure and had got extractions done of lower central incisors because of poor periodontal condition. She had a history of fall and trauma to the permanent left central incisors in childhood. On oral examination 11 & 21 were found discoloured and there was a sinus opening in relation to 21. 11 & 21 were found non vital with no response to the electric pulp testing. Radiographic examinationrevealed a large blunderbuss canal with associated periapical lesion in relation to 21 & periapical lesion was also seen in relation to 11 with completely formed root apex. Based on the history and radiographic findings a provisional diagnosis of chronic periapical abscess was made in relation to 11 & 21.

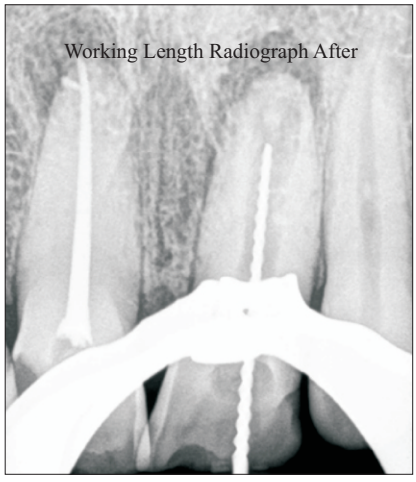

Discoloured 11 & 21

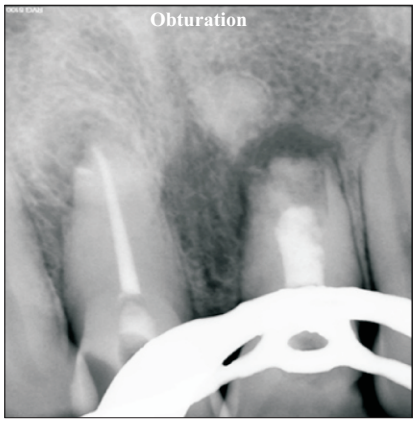

Preoperative Radiograph
Showing Blunderbuss Canal In 21

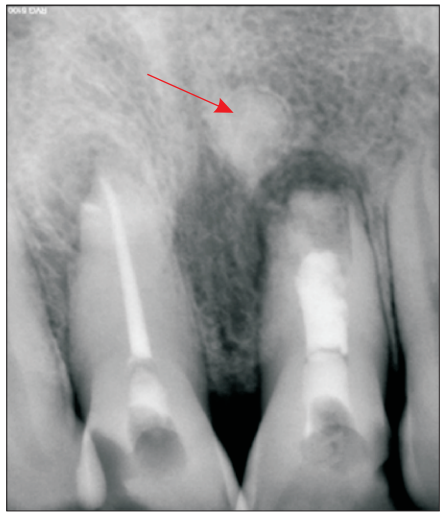
Routine root canal treatment was carried out in relation to 11. In 21 root canal treatment was started with a straight line access, working length was determined using radiovisiograph. Biomechanical preparation was done till No.80 stainless steel k -file under copious irrigation with saline. Calcium hydroxide intracanal medicament (RC Cal, Prime Dental) was placed for 2 weeks. The patient was recalled after 2 weeks and the involved tooth was found to be asymptomatic and the sinus had healed. The access cavity was reopened, irrigated with saline, then root canal was dried with sterile paper points.Biodentine was mixed according to manufacturer's instructions and it was placed with a pluggerin the apical 5 mm. A sterile cotton pellet was placed in the canal for 15 min and the excess of biodentine was removed.

In the next visit new working length was determined using NO. 80 stainless steel K-file and the canal was obturated with thermo plasticized Gutta-percha technique, (backfill,calamus). The access cavity was then sealed with the temporary restoration and patient was recalled after 1 week and thenthe access cavity was restored with permanent restoration. Patient was recalled after 6 weeks, tooth was found to be asymptomatic and healing of osseous defect was seen.Extracoronal and intracoronal bleaching procedure (Pola office) was carried out at this visit. Bleaching was done in 2 sittings to obtain a satisfactory result. Follow up examinations was done at 1 month and 6 months after apexification. Follow up radiographs taken after 6 months showed remarkable healing of the osseous defect and tooth was asymptomatic









Discussion

The development of the root begins after the enamel and the dentin formation has reached the future cemento-enamel junction. At the time of tooth eruption root development is only 62-80% i.e., 2/3rd of the root is formed. If due to trauma or caries exposure , the pulp undergoes necrosis, dentin formation ceases and root growth is arrested. The resultant immature root will have an open apex which is also called as Blunder Buss Canal.[4]

Apexification , or root end closure, is the process whereby a nonvital , immature, permanent tooth which has lost the capacity for further root development is induced to form a calcified barrier at the root terminus.[5]The mineralized tissue can be osteodentin, osteocementum or bone or combination of all.Apexificationis done to obtain an apical barrier to prevent passage of toxins and bacteria into periapical tissue from the root canal and to compact the guttapercha against this barrier.[5] Despite successful apexification done with $Ca(OH)_2$ since years, its disadvantages include a long term treatment and recalls, recurrence of infection and cervical fracture. Materials like Biodentine and MTA are used in single visit apexification procedures, out of which MTA takes around 24 hours to set in moist environment and Biodentine requires 12- 15 minutes to set. MTA was invented by Torebinojad in 1994. It has superior biocompatibility, is less cytotoxic, alkaline pH.Biodentine with active biosilicate technology was introduced by Septodont in 2010.[3,6] Using calcium silicate cements have setting time in the range of several hours. Adding calcium chloride to the liquid component accelerates the system.[3,7]Biodentine has capacity to continue improving in strength with time over several days until reaching 300 MPa after one month.[8] Studies on biological effects of biodentine on immontalized murine pulp cell concluded that Biodentine shows apatite formation after immersion in phosphate solution indicating bioactivity. The deposition of apatite structures might increase the marginal sealing of the material.[9]

In this case the apexification of the blunderbuss canal was done with Biodentine, and again the working length was determined using radiovisiographthe canal was obturated using a thermoplastisized gutta-percha technique(calamus, Dentsply) followed by

Bleaching

Procedure , both extraoral and intra-oral using pola office bleach. The bleaching agents that are most commonly used for whitening of root filled teeth are hydrogen peroxide ,carbamide peroxide ,and sodium perborate .Hydrogen peroxide is the active ingredient in currently used tooth bleaching materials . It might be applied directly or can be produced by a chemical reaction from carbamide peroxide or sodium perborate

Conclusion

Since years there have been many changes in the rationale governing the treatment of teeth with open apex. Therefore it is essential to have thorough understanding of the compatibility of the material, which is being used; its physiological response, and the histological changes that takes place during and after the use of the materials.Biodentine used in creating an artificial apical barrier in the cases with immature closure of root apex,explores a new paradigm in the field of apexification. The excellent biocompatibility and shorter setting time of Biodentine makes it a promising material for one visit apexification.

References

References are available on request at editor@healtalkht.com