ISSN: 2581-5989
PubMed - National Library of Medicine - ID: 101738774

International Journal of Dental Science and Innovative Research (IJDSIR)

IJDSIR : Dental Publication Service

Available Online at: www.ijdsir.com

Volume – 6, Issue – 4, July - 2023, Page No. : 41 - 44

Management of non-vital anterior teeth with open apex: A follow up of 10 Years

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Citation of this Article: Dr Gaurangi Lavania, Dr Anuj Lavania, Dr. Pankaj Sancheti, Dr Shyam Agarwal, "Management of non-vital anterior teeth with open apex: A follow up of 10 Years", IJDSIR- July - 2023, Volume – 6, Issue - 4, P. No. 41 – 44.

Type of Publication: Case Report

Conflicts of Interest: Nil

Abstract

Open apices have a typical anatomy characterized by greater widt at the apical portion, absence of apical constriction and thin dentinal walls. Endodontic treatment of these teeth requires complete elimination of bacteria from the root canal and prevention of re-infection canal space and obturation of such cases poses an endodontic challenge.

This Case report describes the management of a permanent central inciosr tooth with open apex with the help of lyophilized collagen matrix and reverse cone guttapercha technique.

Keywords: Root, Canal, Teeth.

Introduction

Immature teeth with open apices are always cases with difficult immediate resolution. [1] The apical anatomy of these teeth is characterized by greater width at the apical portion, absence of apical constriction and thin dentinal walls. Endodontic treatment of these teeth requires complete elimination of bacteria from the root canal and prevention of re-infection canal space. This poses a great challenge in treatment and prognosis of such cases because of difficulties in establishing the working length (WL) [2] and extrusion of irrigation or obturation materials [3] is possible during treatment.

Case report

A 16-year-old male patient with no relevant medical history walked into Endodontic clinic for undergoing orthodontic treatment. Clinical investigation revealed a slight discoloration on maxillary right incisor. History of trauma with a football was present approximately 6 years prior. Palpation and percussion was negative at the related area. Mobility and periodontal probing was within physiological limits. Radiographic examination showed an incomplete root formation along with a periapical lesion located in the apex for tooth #11 and

(Fig. 1a). Pulp vitality with cold test (Endo-Frost, Roeko, Langenau, Germany) and electric pulp testing (Digitest II, Parkell Inc), gave a negative response which was suggestive of pulp necrosis. Considering the width of the apex, and thin dentinal lateral walls , an apical matrix and reverse Guttapercha obturation was decided as the treatment plan. Patient was informed with the treatment plan and a consent form was obtained.

In the first session, coronal access was prepared with a round burr followed by rubber-dam placement for isolation. The WL was estimated by periapical radiography using a #30 K-file. Cleaning and shaping was done with crown-down instrumentation together with 2.5% NaOCl irrigation (PPH Cerkamed, Poland) and continuous aspiration to avoid any accidental extrusion of the solution. Then, the canal was dried with sterile paper points and filled with a mixture of CaOH2 powder (Sultan, USA) and saline and the tooth was temporarily restored.

One week later, the intracanal medicament was removed and canal was irrigated with 2.5% NaOCl solution. The canal was dried with sterile paper points. Lyophilized collagen sponge was applied as apical matrix in the canal using hand pluggers (Queen, Hungary), and packed into the apical segment followed by reverse cone gutta-percha mastercone size 40 . The canal was obturated with reverse cone gutta percha (MetaBiomed, Korea) and a resin based sealer (Ah plus,Dentsply, USA) using lateral condensation (Fig. 1c). Tooth was restored with composite (3M Filtek, 3M, USA) following root canal obturation.

Orthodontic treatment was reassigned until healing was acceptable. Ten year radiographic showed that the periapical lesion at the apex was no longer present (Fig. 1d). Tooth was clinically and radiographically asymptomatic. However the thin dentinal walls pose a challenge in orthodontic treatment .

Discussion

Open apices are a problem for the realization of the root canal treatment because they favor the extravasation of irrigating solution and/or sealer into periradicular tissues, which can have a negative effect on the apical healing process. [4]

Intracanal dressing of calcium hydroxide, is recommended for treatment of these cases, its intracanal use for a long time may reduce the resistance of root walls to fracture in future [5, 6, 7]. However, other problems include multiple treatment sessions and the risk of root canal contamination by microbial coronal leakage and the possibility of irregular shape of apical foramen and porous apical barrier.

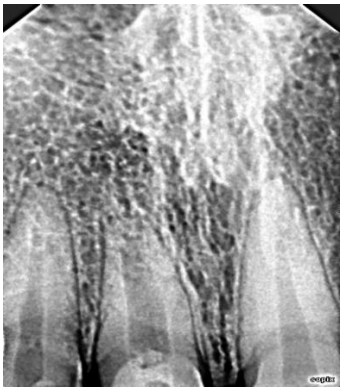
In this report, the rationale of using an intracanal medicament prior to final obturation was primarily to limit the bacterial count since various combinations of bacteria are found in root canal system of necrotic teeth.[19] CaOH2 has the ability to provide an antibacterial environment thus, facilitate the decontamination of the pulp cavity.[20] Additionally, with its high pH, the prior use of CaOH2 dressings becomes necessary to create favourable conditions for healing. [8]

The lyophilized collagen hemostatic sponge is easy to handle and its tissue tolerability is satisfactory, since its insertion in the apical radicular third can be performed with the aid of a specific gutta-percha condenser or endodontic file [9,10]. The lyophilized collagen sponge used in presented cases, is absorbable and has porcine origin, with better biocompatibility than that obtained from animal skin (Gelfoam), because in 24 days it promotes complete alveolar bone healing with presence of trabecular bone and large amount of blood vessels and

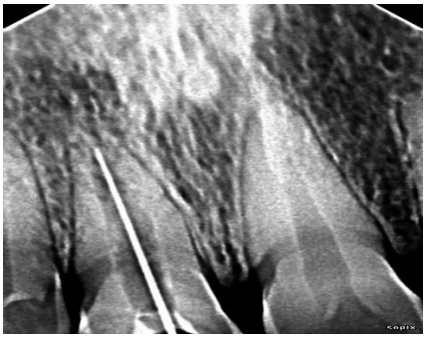
fibroblasts [11]. Possibly, this healing process also occurs after placement of the lyophilized collagen sponge in the radicular apical third in open apex cases, since healing of the periapical lesion is similar to alveolar bone socket [12,13].

Many obturation techniques can be used to achieve an adequate seal, but none will prevent 100% leakage in the long term [14,15]. These techniques have their advantages and disadvantages. Cold lateral compaction being the most common taught procedure and the readily available of GP points in general dental practices, as opposed to other techniques and materials such as warm vertical condensation, thermo-mechanical technique, carrier-based systems, plastic techniques and apical barriers [16]. It is also arguable that the lateral compaction is advisable compared to the vertical one as regards to the lateral forces exerted on the thin root walls.

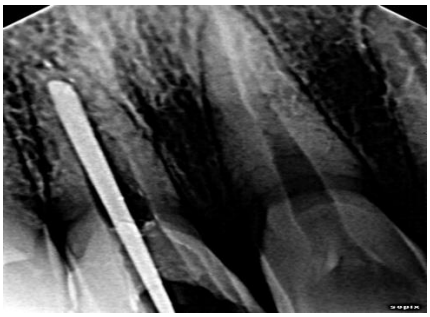
Preoperative radiograph



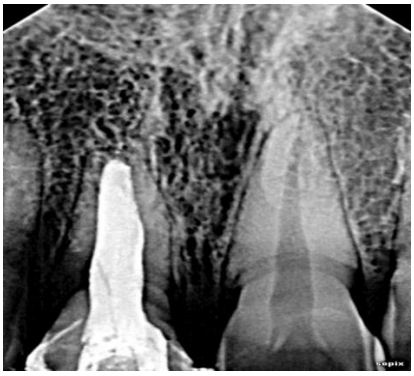
Working length radiograph



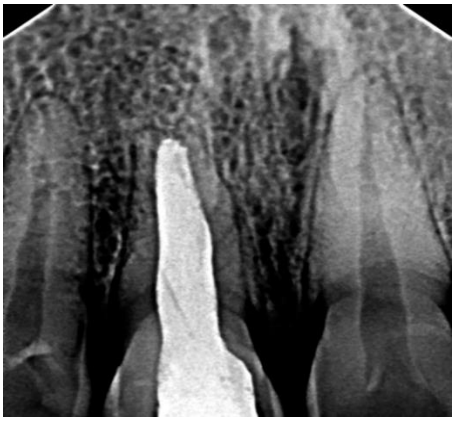
Mastercone radiograph



Post obturation radiograph



10 year follow up x ray



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