

“Second chance to save your tooth”- A Case report

Surekha Puri,¹ Mihir Pandya,² Pooja Trivedi,³ Ravjot Ahuja⁴

ABSTRACT

Retreatment in endodontics provides a second chance for the patient to save the tooth that would otherwise be deemed for extraction. Treatment approach can be either surgical or non surgical. Treatment failure can be due to many reasons from missed canal to iatrogenic perforation which has to be evaluated carefully before initiating the treatment. Sometimes a clinician also has to deal with inter appointment flare ups requiring prompt and efficient patient management. This case report describes the non surgical management of failed root filled teeth.

Key words: Calcium hydroxide, Endodontic failure, Retreatment

Introduction

Conventional endodontic treatment may fail due to various reasons and inadequate root canal treatment with persistent infection remaining in inaccessible areas of the canal being one of them^{1,2}. When patient reports to the dental clinic with severe pain/swelling on the tooth that has previously been root filled they are anxious and skeptic about whole of endodontic treatment posing clinician in tricky state of patient management. Endodontic retreatment offers the patient a second chance to save a root canal treated tooth that would otherwise be destined for extraction. Such a retreatment can be carried out either surgically or non surgically. Nonsurgical retreatment when possible often is the first choice for attempting to correct obvious deficiencies in the previous treatment. However, surgical retreatment would be the choice in the presence of certain indications like presence of an apical cyst, anatomical or iatrogenic obstruction etc³. The surgical procedure can effectively remove the infected portion of the root colonized by bacteria either intraradicular or extraradicular or both, thus enhancing the chances of healing. Consequently, complete healing after periapical surgery has been reported in 37%–97% of

of teeth. Nevertheless, it can show signs of failure due to poor root canal treatment, faulty surgical procedure, lack of retrofilling⁴. In case of a surgical failure, re-surgery has showed reduced success rates compared with first-time surgery. It has been reported that success rates were 5%–27% lower for re-surgery compared with first-time surgery⁵. Further surgical procedure can be a traumatic experience with many disadvantages like pain, edema, discolorations and other post operative complications which can hamper the patients daily activities. Hence it is advisable to select a nonsurgical retreatment wherever feasible with an emphasis on effective sealing of infected root canal.

Generally surgical retreatment would be carried out following a nonsurgical endodontic failure, on the contrary, this case report deals with the non surgical retreatment following the surgical treatment failure of a previously endodontically treated maxillary central and lateral incisors.

Case Report

A 19 years old female patient reported with severe pain on upper front teeth since 2 days. Brief history revealed that Patient had a traumatic injury followed by Root Canal Treatment around 9 years ago.

On clinical examination, a faulty restoration with a metallic post and composite resin was observed in relation to upper right & left central incisor (11,21) was seen (Fig 1&2).

Radiographic examination revealed radiograph insufficiently obturated canals were noted in relation to 11 and 21 with improper placement of a metallic post . (Fig 3).

The subjective and objective findings led to the diagnosis of a endodontic treatment failure with chronic periapical abscess. Patient was explained about the existing condition and the need of retreatment was stressed. However, patient was reluctant to undergo endodontic surgery, still a nonsurgical retreatment of the teeth was agreed.

Then the metallic posts (19 gauge orthodontic wire) which were used as a Post-endodontic restoration were

ABERRATION IN ROOT CANAL MORPHOLOGY OF MAXILLARY FIRST MOLAR – 2 CASE REPORTS

Mihir Pandya¹, Pooja Trivedi², Sandeep Metgud³, Meena Kumari⁴

¹ Post graduate student. Pacific Dental College and Hospital, Udaipur, Rajasthan, India

² Post graduate student. Pacific Dental College and Hospital, Udaipur, Rajasthan, India

³ Professor & Head. Pacific Dental College and Hospital, Udaipur, Rajasthan, India

⁴ Professor. Pacific Dental College and Hospital, Udaipur, Rajasthan, India

Address for Correspondence

Dr. Mihir Pandya (M.D.S)

Post graduate student.

Pacific Dental College and Hospital

Udaipur, Rajasthan, India

Email: dr.mihirpandya@yahoo.com

ABSTRACT

These are the case reports of maxillary first molar that has a rare second palatal canal with a separate root apex and, thus a separate apical foramen. The importance of this case is that it demonstrates that the seemingly ordinary case can present with an anomalous root and root canal configuration. The clinician must be aware that this second palatal canal though rare, can exist and may result in treatment failure if not found and properly treated. The clinician must know not only the normal root canal anatomy but also variation from the normal. It is also paramount for the clinician to seek out every possible aberration of root canal anatomy for all teeth undergoing treatment.

Key words: *aberrations; bifurcation; palatal canal; root canal therapy*

Delayed multidisciplinary management of an intrusively luxated maxillary lateral incisor- A case report

Chirag Pandya,¹ Mihir Pandya,² Soham Patel,³ Milan Ughareja⁴

ABOUT THE AUTHORS

1.Dr. Chirag Pandya MDS
Senior lecturer
Department of orthodontics
Karnavati school of Dentistry
Gandhinagar, Gujarat.

2.Dr. Mihir Pandya BDS
Postgraduate student
Department Of Conservative
Dentistry & Endodontics
Pacific Dental College
Udaipur, India

3.Dr. Soham Patel BDS
Postgraduate student
Department Of Conservative
Dentistry & Endodontics
Pacific Dental College
Udaipur, India

4.Dr. Milan Ughareja BDS
Postgraduate Student
Department Of Conservative
Dentistry & Endodontics
Pacific Dental College
Udaipur, India

Corresponding Author:

Dr. Mihir Pandya

Post Graduate Student
Department Of Conservative
Dentistry & Endodontics
Pacific Dental College
Udaipur, India

Email:
dr.mihirpandya@yahoo.com

Abstract

Crown fractures account for the highest percentage of all traumatic injuries to the permanent dentition. This paper reports a case of delayed (1 month after the injury) multidisciplinary management of an intrusively luxated permanent lateral incisor. The intruded tooth was diagnosed as necrotic without coronal discoloration. Upon completion of root canal treatment, the tooth was repositioned orthodontically and finally restored post endodontic therapy for esthetic purposes.

KEYWORDS: Crown fractures, multidisciplinary management, traumatic injuries

Introduction

Crown fractures account for the highest percentage of all traumatic injuries to the permanent dentition.¹ Intrusive luxation is the partial displacement of a tooth from its bony socket. Clinically, intruded teeth were seen shortened with deviation in association with bleeding from the periodontal ligament. There is pain during occlusion, either no or mild spontaneous pain. Radiographically, an extruded tooth exhibits an decreased periodontal ligament space after the accident.^{1, 2} This paper reports a case of delayed (1 month after the injury) multidisciplinary management of an intrusively luxated permanent lateral incisor. The intruded tooth was diagnosed as necrotic without coronal discoloration. Upon completion of root canal treatment, the tooth was repositioned orthodontically and finally restored post endodontic therapy for esthetic purposes.²

Case report

A 18-year-old girl presented to the Department of Endodontics, Pacific Dental College, Udaipur, Rajasthan (India) with discomfort and mild pain in her maxillary right lateral incisor upon biting. She reported falling on her face while climbing down the stairs 4 month earlier. She got the endodontic treatment done for the central incisors in a private dental clinic. Clinically, the right lateral incisor was intrusively luxated while the central incisor had a horizontal crown fracture. This lateral incisor was indicated for extraction in the private clinic so the patient turned up to our department for a second opinion.

The tooth was diagnosed as non-vital after electrical pulp and cold tests. There was no color change in the crown and the crown of the tooth was intact. Radiographically, the right lateral incisor was displaced with an apical radiolucency associated with the loss of lamina dura and widening of the periodontal ligament. There was no sign of external or internal root resorptions. The mobility of the luxated tooth was recorded as grade 1.

Reimplantation Of Avulsed Teeth After Dry Storage For One Week

Surekha Puri,¹ SupratimTripathi² Mihir Pandya,³ Pooja Trivedi⁴

ABOUT THE AUTHORS

1. Dr. Surekha Puri,

Associate Professor
Department Of Conservative
Dentistry & Endodontics
Pacific Dental College
Udaipur, India

2. Dr. SupratimTripathi

Post Graduate Student
Department Of Conservative
Dentistry & Endodontics
Pacific Dental College
Udaipur, India

2. Dr. Mihir Pandya

Post Graduate Student
Department Of Conservative
Dentistry & Endodontics
Pacific Dental College
Udaipur, India

3. Dr. Pooja Trivedi

Post Graduate Student
Department Of Conservative
Dentistry & Endodontics
Pacific Dental College
Udaipur, India

Corresponding Author:

Dr. Mihir Pandya

Post Graduate Student
Department Of Conservative
Dentistry & Endodontics
Pacific Dental College
Udaipur, India

Email:

dr.mihirpandya@yahoo.com

Abstract

Management of tooth avulsion in the permanent dentition often presents a challenge. Avulsion is serious injury cause damage to dental and supportive tissues, ranges from 1-16 % among dental injuries and it mostly occurs in maxillary incisors. Definitive treatment planning and consultation with specialists is seldom possible at the time of emergency treatment. Replantation of the avulsed tooth can restore esthetic appearance and occlusal function shortly after the injury. This article describes the management of a female patient with an avulsed maxillary permanent incisor that had been air-dried for about 7 days.

KEYWORDS: tooth avulsion, Replantation, permanent dentition

Introduction

Avulsion is defined as a complete separation of a tooth from its alveolus following a traumatic injury which results in extensive damage to the pulp and periodontal tissues⁴. Reimplantation refers to the insertion and temporary fixation of completely or partially avulsed teeth that have resulted from traumatic injury.

Studies have shown that teeth that are protected in a physiologically ideal media can be replanted twenty-four hours after the accident with good prognosis. The success of delayed reimplantation depends on the vitality of the cells remaining on the root surface², the length of extra oral dry time¹ and the stage of root development.

Avulsion of teeth results from traumatic injuries in the oro-facial region. World Health Organization's classification system later modified by Andreasen, avulsion is classified as an

- injury of periodontal tissues,
- extrusive,
- lateral, or
- intrusive luxation.¹

As a treatment option, reimplantation restores occlusal function and esthetics shortly after injury. In reimplantation complete reestablishment of vitality of periodontal fibers is the prime objective. The percentage of success of tooth reimplantation has been observed to be low, ranging from 4 to 50%.¹ The reattachment of periodontal fibers and the formation of Sharpey fibrils occur about 2 weeks after reimplantation.⁵

Extra-alveolar dry time and the storage media used to transport the tooth are critical factors for successful and long-term outcomes. Treatment is often complex, time-consuming, expensive and requires multidisciplinary approaches such as endodontic and periodontal treatment, surgery, orthodontic movements and esthetic coronal restoration. Reimplantation-associated root resorption can often result in complications such as infra-occlusion leading to poor esthetics, tilting of adjacent teeth, loss of function and eventually loss of the affected teeth. The benefit of tooth reimplantation in such cases is mainly the time gained to establish an optimal permanent treatment plan and preservation of the width of the alveolar bone.

Endodontic management of a case of mandibular molar with three distal canals

Meena Kumari* Mihir Pandya† Pooja Trivedi† Moulshree Dubae‡ Krishna Prasad Shett§

*MDS, Professor, †Post Graduate Student, ‡MDS, Senior Lecturer, Department of Conservative Dentistry, Pacific Dental College and Hospital, Debari, Udaipur, Rajasthan, India §MDS, Professor, Department of Conservative Dentistry, Navodaya Dental College and Hospital, Raichur, Karnataka, India. Email: drcmk15@yahoo.co.in

Abstract:

The knowledge of variations in root canal morphology of all teeth is very important for a successful endodontic treatment. There are many case reports of incidences of three mesial canals and two distal canals. This case report discusses the incidence, morphology and management of a rare anatomical configuration of mandibular first molar with three canals and separate apical foramina in distal root. This case report also discusses the importance of their identification, causes for failure and their management. Keywords: Abstract The knowledge of variations in root canal morphology of all teeth is very important for a successful endodontic treatment. There are many case reports of incidences of three mesial canals and two distal canals. This case report discusses the incidence, morphology and management of a rare anatomical configuration of mandibular first molar with three canals and separate apical foramina in distal root. This case report also discusses the importance of their identification, causes for failure and their management.

Keywords: Abnormal root anatomy, mandibular first molar, root canal system, canal configuration.

Introduction:

Several studies have reported variations in root canal morphology of mandibular first and second molar. Mandibular first molars are the first permanent posterior teeth to erupt and are the most often tooth which are affected by dental caries and is the most frequent tooth to undergo endodontic treatment. The usual anatomy of mandibular molars have two roots, one mesial and one distal,

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Maxillary first molar with two palatal roots located under dental operating microscope

Prashant P. Shetty,¹
Madhusudan S. Astekar,² Ankil Jain,¹
Mihir Pandya¹

¹Department of Conservative and Endodontics; ²Department of Oral Pathology, Paher University, Pacific Dental College and Hospital, Udaipur, India

Abstract

An awareness and understanding of the presence of an additional root and unusual root canal morphology is essential as it determines the successful outcome of endodontic treatment. A thorough knowledge of basic root canal anatomy and its variation is necessary for successful completion of endodontic treatment. This report points to the importance of looking for additional roots and canals with the help of operating microscope. Finding additional roots and canals would enable clinician to successfully treat a case that would otherwise not be successful.

Introduction

A thorough knowledge of tooth morphology, careful interpretation of angled X-rays, proper access preparation and a detailed exploration of the tooth are essential prerequisites for a successful treatment outcome. Magnification, operating microscope, loupes and illumination are aids that must be utilized to achieve this goal.¹ Anatomical characteristics of permanent maxillary molar are generally described as a group of teeth with three roots, one palatal and two buccal roots. The variation include one,² four,³ five⁴ individual roots and unusual morphology⁵ of root canal systems within individual roots. Case reports with five⁶ and six⁷ root canals or with a C-shaped canal configuration⁸ have also been reported earlier.

Christie *et al.* analyzed endodontic treatment in 16 maxillary molars and of 6 extracted teeth with 2 palatal roots and classified these 22 molars into three types (I-III), according to root separation level and their divergences.³ The frequency of 2 palatal roots is low; however, a few cases have been reported in the literature (Saler and Goel BR. Frequency of fourth root canal in the maxillary first molar, an *in-vitro* study. 1995; unpublished data). Literature is reviewed regarding the presence of extra

canals in palatal root of maxillary molars.⁹ The incidence of 2 root canals in the palatal roots of maxillary molars has been reported to be 2-5.1%. Two canals in a single palatal root may present in one of the following types: i) two separate orifices, two separate orifices and two separate foramina; ii) two separate palatal roots, each with one orifice, one canal and one iii) one palatal root, one orifice, one orifice, a bifurcated canal and two foramina.

The present case comes under type I of the Christie *et al.* classification. A dental operating microscope, with its magnification and illumination helps in the easy detection of hidden canals and allows a more detailed vision of the internal root canal system. With the use of the microscope, the success rate has definitely increased in the recent past. A case report of a maxillary first molar with four root canals (one mesiobuccal, one distobuccal and two palatal) using a dental operating microscope is presented here.

Case Report

A 35-year-old male patient reported with a history of pain in relation to the upper right posterior region. Root canal treatment of the particular tooth in question was initiated by a general dental practitioner. Even after the biomechanical preparation of all the three canals to the proper working length, the pain did not subside. The patient was referred for further treatment to the Pacific Dental College, Udaipur. Under local anesthesia of 2% lidocaine with 1:1,00,000 epinephrine, the temporary restoration was removed and the access preparation was evaluated for presence of any extra canals. Gates Glidden drills 1, 2 and 3 were used to flare the coronal portion of the canals to improve straight line access. Complete deroofting of pulp chamber was carried out, conventional triangular access preparation was modified to trapezoidal shape, and an exploration of the floor of chamber under a surgical operating microscope revealed four canal orifices. The palatal roots had two orifices, fairly well separated, exiting from the floor of the pulp chamber (Figures 1 and 2). The working length of each canal was estimated by means of an apex locator (Ray Pex 5, VDW GmbH, Germany) and confirmed with intra oral periapical X-ray (Figure 3). The canals were initially instrumented with stainless steel K files (n 10/15) under irrigation with 3% sodium hypochlorite. Biomechanical preparation of both the palatal canals was performed using the crown down technique with Protaper rotary instruments (Dentsply, Maillefer, Switzerland). Mesiobuccal and distobuccal canals were shaped by the crown down technique using a 35 master apical file for

Correspondence: Madhusudan S. Astekar, Department of Oral Pathology, Paher University, Pacific Dental College and Hospital, Udaipur, (Rajasthan), India.
Tel: 09413026974.
E-mail: madhu.tanu@gmail.com

Key words: anatomical variations, maxillary first molar, number of canals, dental operating microscope.

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mesiobuccal (MB) and a 40 for distobuccal (DB). Master cone radiograph was taken (Figure 4). Final irrigation with 17% EDTA followed by 3% sodium hypochlorite (Novo Dental Pvt. Ltd, India) was carried out. The root canal was dried with paper points. Obturation of root canal space was performed with gutta-percha (Dentsply, Maillefer, Switzerland) and AH plus resin sealer (Dentsply DeTrey GmbH, Germany) (Figure 5) using a lateral condensation technique and the tooth was restored with a posterior composite filling P60 (3M FiltekTM, USA).

Discussion

The goal of root canal treatment is to obtain a clean root canal system thoroughly and to fill it in all dimensions. Canals are often left untreated because the dentist fails to recognize their presence. The variations in the canal anatomy play an important role in endodontic therapy. The majority of endodontic literature describe maxillary first molar having three root canals. Now with detail understanding of canal morphology with the advent of operating microscope and computed tomography, the occurrence of two palatal roots has been confirmed by Christie *et al.*³ Christie *et al.* speculated that maxillary molars with two palatal roots may be encountered once every three years in a busy endodontic practise. Slowey also reported maxillary molar with two palatal roots.¹⁰ In supernumerary roots, its formation could be related to external factors during odontogenesis. Rostein examined 1200 molars and found a 0.4% incidence

Re-Attachment – A Conservative Esthetic Emergency Protocol

Prashant P. Shetty,¹ Mihir Pandya,² Pooja Trivedi,³ Soham Patel⁴

ABSTRACT

Injury to anterior teeth is a relatively common event among children and teenagers. Dentists are confronted with managing dental trauma and restoring fractured teeth on a regular basis. Hence the technique that speed and simplify treatment, restore esthetics and improve long term success rate are therefore of potential value and should be considered. If an intact tooth fragment is present after trauma, the incisal edge reattachment procedure presents a conservative, simple and esthetic alternative. It also restores function, provides a positive psychological response and is a relatively simple procedure. Clinical trials have reported that reattachment using modern dentine bonding agents and resin system may achieve a functional and esthetic success. This article reports on two coronal tooth fracture cases that were successfully treated using tooth fragment reattachment.

KEYWORDS: Crown fracture, Trauma, Tooth fragment reattachment, Resin composite restoration.

Introduction

A common occurrence in dentistry is the fracture of anterior teeth that mainly affects children and adolescents, due to some kind of traumatic injury during play or work^{1,2}. An uncommon component of this occurrence is the intact availability of the fracture piece or fragment. Majority of dental injuries involves the anterior teeth, especially the maxillary incisors (because of its position in the arch), whereas the mandibular central incisors and maxillary lateral incisors are less frequently involved. Dental injuries usually are less frequently involved. Dental injuries usually affect only a single tooth; however, certain trauma types such as automobile accidents and sports injuries involve multiple tooth injuries³. A number of techniques have been developed to restore the fractured crown. Early techniques include Stainless steel crowns, basket crowns, orthodontic bands, pins, pin

retained resin, porcelain bonded crowns and composite resin⁴. Dentists are confronted with managing dental trauma and restoring fractured teeth on a regular basis. Hence the technique that speed and simplify treatment, restore esthetics and improve long term success rate are therefore of potential value and should be considered^{5,6}.

The first published case of reattaching a fractured incisor fragment was reported in 1964 by Chsuck A et al⁷. After this many articles have been published regarding a variety of preparations design fractures and materials for reattachment technique have been described in demanding clinical situations, as in a case report by Simonsen where incision fragment was reattached and tooth subsequently subjected to orthodontic treatment without difficulty⁴.

Some of the advantages from reattachment of fractured tooth fragment are :

- a) Conservation of tooth material.
- b) Colour matching.
- c) Preservation of incisal translucency.
- d) Good esthetics.
- e) Maintenance of original tooth contours.
- f) Economical .
- g) Preservation of occlusal contacts.
- h) Colour stability of enamel.
- i) Positive emotional & social responses from patients.

This article reports on coronal fracture case that was successfully treated using tooth fragment reattachment.

Case Report

A 45 year old male patient reported to department of conservative dentistry and endodontics of Pacific dental college with a chief complaint of a fractured left maxillary lateral incisor because of trauma sustained during fall (Fig.1 & 2).

The crown fragment was attached only to the labial gingiva and was mobile.

Incidence of Radix Entomolaris in the Indian Population - An In-vitro and In-vivo Analysis

Moulshree Dube* Pooja Trivedi† Mihir Pandya†
Meena Kumari‡

*M.D.S, PhD, Assistant Professor †Post Graduate Students,
‡M.D.S, Professor, Department of Conservative and
Endodontics, Pacific Dental College, Udaipur, Rajasthan,
India. Contact:moulshreebee@yahoo.com

Abstract:

Aim: To determine the incidence of Radix Entomolaris in the Indian population using Conventional radiographs, Radiovisiography and Spiral CT.

Materials and Methods: A clinical and radiographic prospective evaluation was made for permanent mandibular first molars (750) scheduled for root canal treatment (including both primary endodontic treatment and retreatment). 300 extracted permanent mandibular first molars were collected to be investigated in the laboratory. Conventional and Digitalized radiography (Radiovisiography) was used for human patients. Spiral CT was used to study the morphology of extracted teeth.

Results: Radix Entomolaris was found in 9% of the teeth examined.

Conclusion: The high frequency of an extra root in mandibular first molars makes it essential to anticipate and find all canals during primary endodontic treatment and retreatment.

Keywords: Anatomical variations, Mandibular first molar, radix entomolaris, Three-rooted molar.

Introduction

The morphological knowledge of root canals is indispensable and improves the operator's ability to locate and trace a root canal to its termination, thereby increasing the degree of successful treatment.¹⁻³ The permanent mandibular first molar is usually two-rooted, a mesial and a distal. The major variant

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Closing the doors on microleakage!!!

Pooja Trivedi* Moulshree Dube[†] Mihir Pandaya[‡] Hitesh Sonigra[§]

* MDS, Lecturer, [†]MDS, Professor, Narshibhat Patel Dental College, Visnagar, India.

[‡]MDS, Reader, Pacific Dental College, Udaipur, India. [§]Lecturer, Goenka Research Institute of Dental Science, Gandhinagar, India. Email: docrrtrivedi@gmail.com

Abstract:

Coronal leakage and apical leakage continues to be a topic of great interest, because of the advances in the field of endodontics, clinical failures still exist. Numerous studies have examined this phenomenon, identified many sources of possible contamination and emphasized the role of the clinician in preventing coronal leakage following root canal treatment. Pulpal and periradicular diseases develop when microorganisms and/or their by-products contaminate these tissues. Therefore, a major goal of both preventive and restorative dentistry is to prevent penetration of microorganisms into the coronal pulpal space and root canal system. The root canal system, once invaded, may harbour many species of microorganisms, their antigenic by-products and variable amounts of inflamed or necrotic tissues. This review article discusses the various methods used for assessing root canal sealing capacity.

Keywords- Coronal leakage, dyes, dye dilution techniques, filtration.

Introduction:

Innovations in materials, equipments and techniques continue to sophisticated endodontic treatment procedures enhancing the incidence of predictable clinical success. However, inspite of these advances, clinical failures/shortcomings still persist.^[1] Concept of microleakage having an effect on the outcome of endodontic treatment has been known for more than 100 years.^[2]

Microleakage is defined as the "Diffusion of the bacteria, oral fluids, ions and molecules into the tooth and the filling material interface" or "

defined as the clinically undetectable passage of bacteria, fluids, molecules or ions between tooth and the restorative or filling material".^[3] Many studies emphasize that tooth filling materials are not fixed, inert and impenetrable borders but 'Dynamic micro crevices which contain busy traffic of bacteria, ions and molecules'.^[4]

This leakage may be clinically undetectable, but is a major factor influencing the long term success of endodontic therapy as it causes many severe biological effects leading to recurrence of the pathology and failure of the root canal treatment.^[5]

Endodontic therapy endeavours to remove microorganisms, sanitize and seal the root canal space and entombs the bacteria.^[6] Ingress of the bacteria, biofilms and their by-products leaking from the root canal through the apical foramen, accessory canals, furcation canals, improper coronal seal, etc. are the major pathways of microleakage. It is thus essential to remove bacteria from the root canal system, at the same time avoiding the entry of new bacteria.^[7]

Hence, microleakage is arguably the single most risk factor for failure of endodontic therapy. Thus, closing the doors on microleakage opens the doors to more predictable and successful endodontic outcomes of endodontic therapy.^[8]

Leakage at micron level (Bacterial leakage)

It can be inferred from the definition of microleakage that, marginal gaps around a restoration permit bacteria to pass into the tooth/restoration interface. This is considered to be bacterial microleakage, which is seen at micron level. Numerous studies have shown that once cariogenic bacteria gain access into the tooth/restorative interface they are able to successfully proliferate along this area with the potential to cause an adverse response from the pulp and recurrent caries.^[9,10]

However, it is still questionable about the marginal gap size around the restorations and occurrence of recurrent caries. It is also reported that recurrent caries rate significantly increases with the extent of wide marginal gap.^[11] The origin

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Comparative evaluation of antibacterial efficacy of *Spilanthes calva* DC root extract, sodium hypochlorite, chlorhexidine and doxycycline at different concentrations on *Enterococcus faecalis* - An in-vitro study

Moulshree Dube #

Meena kumari #

Mihir Pandya #*

Santha Dube #

Pooja Trivedi ##

ABSTRACT

Aims: To evaluate and compare the antibacterial activity of *Spilanthes Calva* DC root extract (100mg/ml) with different concentrations of 3% Sodium hypochlorite (NaOCl) (V-consept, Vishal Dentocare, India), 2% Chlorhexidine (V-consept, Vishal Dentocare, India) and Doxycycline against *Enterococcus faecalis* (American Type Culture Collection 29212).

Materials and Methods: Antimicrobial activity was assayed by Kirby-Bauer (1966) cup-well agar diffusion method. 30 ml culture medium was dispensed in respective petridishes and inoculated with 0.1 ml fresh culture of *Enterococcus faecalis*. Three cup-wells of 16mm diameter were bored in each petriplate and were filled with respective test agents. Total 60 replicates were taken for the study; each test agent group was assayed in 10 replicates. All the inoculated media plates were incubated for 24 hours at 37°C under aerobic conditions. The antibacterial efficacy was interpreted from the size of the zone of inhibition measured to nearest in millimeter (mm) as observed from the clear zones surrounding the wells.

Results: Statistical analysis revealed that all the irrigants were effective against *Enterococcus faecalis*. Doxycycline (10mg/ml) was significantly more effective than *Spilanthes calva* DC root extract, 2% Chlorhexidine and 3% Sodium hypochlorite ($P < 0.001$). *Spilanthes calva* (100mg/ml) and Sodium hypochlorite showed comparable inhibition ($P > 0.05$) against *Enterococcus faecalis*. 2% Chlorhexidine was significantly ($P < 0.001$) more effective than 3% Sodium hypochlorite.

Conclusion: Under the tested conditions and within the limitations of the present study, it maybe concluded that *Spilanthes calva* DC root extract may have potential as a root canal irrigant warranting further investigations. Therefore further in vivo studies for the evaluation of the different aspects of the extract would be relevant.

Keywords: Antibacterial activity, Chlorhexidine, *Enterococcus faecalis*, Sodium hypochlorite, Root canal irrigants.

Introduction

Complete debridement and disinfection of the pulpal space are considered to be essential for predictable long-term success in endodontic treatment. Residual pulpal tissue, dentine debris

bacteria and their by-products may persist in the irregularities of root canal systems, even after meticulous mechanical preparation.¹ When these microorganisms remain within a supporting environment, they can proliferate and re-infect the



Morphometric Analysis of the Relationship between the Maxillary Sinus Floor and Maxillary First Molar – A CBCT Study

Dr. Usha Balchandani¹, Dr Kamal Bagda², Dr. Mihir Pandya³, Dr. Nimesh Patel⁴

1) (Pg Student, Faculty of Conservative Dentistry and Endodontic of Goenka Research Institute of Dental Science)

2) (Dean And Head of Department Faculty of Conservative Dentistry and Endodontic of Goenka Research Institute of Dental Science)

3) (Professor, Faculty of Conservative Dentistry and Endodontic of Goenka Research Institute of Dental Science)

4) (Reader, Faculty of Oral Medicine and Radiology of Goenka Research Institute of Dental Science)

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ABSTRACT:

Aim: The study aimed to investigate the proximity of maxillary First Molar teeth roots to maxillary sinus floor.

Materials and Methods: The methods used to analyse and measure are as follows: Evaluation of the vertical relationship between the maxillary first molar teeth and the MSF was done in sagittal and coronal CBCT planes simultaneously and categorized into the three types.

Type IS: The root tips extending above/inside the MSF

Type CO: The root contacting with the MSF

Type OS: The root extending below/outside the sinus floor

Results: Reviewing and Evaluating the roots of maxillary first molar in relation to the proximity to various CBCT scans, the data received showed that out of 2500 scans, only 1500 samples were such where the root of maxillary first molar was either approaching the sinus lining or perforating the sinus lining. The evaluation states that 60% of the maxillary first molar roots are at the proximity with the maxillary sinus lining.

Conclusion: Thorough knowledge of the case is must, with precautionary measures to be taken for any endodontic therapy such as CBCT scans, or even a panoramic Xray is must to identify the maxillary sinus lining and refrain

KEYWORDS: maxillary sinus floor, maxillary first molar, CBCT, sodium hypochlorite accident.

nose. It is one of the first paranasal sinuses to develop and it stops growing on the eruption of the third molar around 20 years of age.

This sinus has three recesses: An alveolar recess pointed inferiorly, bounded by the alveolar process of the maxilla; a zygomatic recess pointed laterally, bounded by the zygomatic bone; and an infraorbital recess pointed superiorly, bounded by the inferior orbital surface of the maxilla. The medial wall is composed primarily of cartilage. The maxillary sinus varies in its extension. If the sinus is of an average size, it is on a level with the floor of the nose; if the sinus is large, it reaches below this level. Projecting into the floor of the antrum is several conical processes, corresponding to the roots of the first and second molar teeth; in some cases, the fangs of the teeth perforate the floor⁽¹⁾

In about half of the population, the sinus floor extends between adjacent teeth or individual roots, creating elevations in the antral surface, commonly referred to as 'hillocks'. The roots of the maxillary premolar, molar and occasionally canine teeth may project into the maxillary sinus. Because of the implications this can have complications on surgical procedures, it is essential for clinicians to be aware of the exact relationship between the apical roots of the maxillary teeth and the maxillary sinus floor.⁽²⁾

The pathological disruption of both periapical and adjacent sinus tissue resulting from endodontic infection has since been well documented (Selden & August 1970, Selden 1974, Selden 1977, Selden 1989). The reported frequency of sinusitis of dental origin varied considerably, between 4.6 and 47% (Melen et al. 1986) of all sinusitis cases. The spread of pulpal disease beyond

I. INTRODUCTION

The pyramid-shaped maxillary sinus (or antrum of Highmore) is the largest of the paranasal sinuses and drains into the middle meatus of the

Comparative Evaluation of the Shaping Ability of Nickel Titanium Rotary Instruments in curved canals, Protaper Next vs Twisted File an In-Vitro Study

Akash Azad^{1*} Shraddha Chokshi² Shashin Shah³ Mihir Pandya⁴ Soham Patel⁵ Rupal Vaidya⁶

¹Senior Lecturer, Department of Conservative Dentistry and Endodontics, Goenka Research Institute of Dental Sciences, Gandhinagar, Gujarat, India.

²Professor and Head, Department of Conservative Dentistry and Endodontics, Ahmedabad Dental College and Hospital, Gandhinagar, Gujarat, India.

³Professor and Head, Department of Conservative Dentistry and Endodontics, Goenka Research Institute of Dental Sciences, Gandhinagar, Gujarat, India.

⁴Reader, Department of Conservative Dentistry and Endodontics, Goenka Research Institute of Dental Sciences, Gandhinagar, Gujarat, India.

⁵Reader, Department of Conservative Dentistry and Endodontics, Goenka Research Institute of Dental Sciences, Gandhinagar, Gujarat, India.

⁶Professor, Department of Conservative Dentistry and Endodontics, Ahmedabad Dental College and Hospital, Gandhinagar, India.

ABSTRACT

Background: The purpose of this in vitro study is to compare the shaping ability of ProTaper Next (PTN) and Twisted Nickel (TF) Titanium rotary instruments in the maxillary and mandibular first and second molars with curvature of 25 to 90 degrees using digital radiography.

Materials and Method: Forty maxillary and mandibular first and second molars extracted for orthodontic or periodontal reasons were selected. The crown of each tooth was removed at the level of the CEJ using a diamond disc. A #10 stainless steel K-type hand file was kept at the working length and digital radiographs were taken for each specimen. The root canals were then divided in two groups: Group A- PTN and Group B- TF, the root canals were instrumented by these systems to their full length according to the manufacturer's instructions. Postoperative radiographs were taken with the last file used inside the root canals. The digital radiographs were enhanced. The angle and radius of the root canal curvature were determined according to Pruett's method using the software Scion Image and the distance between these two central axes at working length was measured. Dentine removal was measured at five reference points.

Results: The analysis of removed dentine showed that both the titanium rotary instruments cut uniformly at all the reference points. The instrumentation symmetry indicated that both systems maintained the original curvature of the root canal. The mean loss of working length was 0.495±0.437 mm for PTN and 0.435±0.267 mm for TF. The mean apical transportation for PTN was 0.343mm for TF was 0.252mm, the difference between these values were not significant.

Conclusions: Within the limitations of this study, it can be concluded that although both the system are based on different principles, PTN and TF were statistically equal in shaping curved canals and they respected the original canal anatomy, without any aberrations or failures.

Keywords: Shaping ability, Nickel Titanium, Twisted file, Protaper Next, NiTi Rotary file system.

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*Correspondence Dr. Akash Azad.

Department of Conservative Dentistry and Endodontics, Goenka Research Institute of Dental Sciences, Gandhinagar, Gujarat, India.

Email: akash.azad@yahoo.com



Case Report

The premolar miscellany- A case series of various aberrant root canal systems

Shashin Shah¹, Aadil Thimwala^{1,*}, Mihir Pandya¹, Soham Patel¹¹Dept. of Conservative Dentistry and Endodontics, Goenka Research Institute of Dental Science, Gandhinagar, Gujarat, India

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ABSTRACT

Premolars have been blessed for having an aberrant root canal anatomy. The occurrence of more than 2 canals with different portal of exit is very rare. If one is facing the scenario of treating the maxillary and mandibular premolars clinically then he must be aware of the internal anatomy of these teeth. These teeth may require special shaping and obturating techniques. This case series is the reflection of the endodontic challenges clinicians face to manage such cases. Careful examination of pre-operative radiograph and careful negotiation is necessary to deal with such variable anatomies.

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1. Introduction

To achieve a successful endodontic treatment, a thorough knowledge of root and root canal morphology as well as possible variation in anatomy of the root canal system is of utmost importance. This is followed by negotiation, cleaning, shaping, and obturation of the entire root canal system in three dimensions. Failure to recognize the presence of an additional root canal may result in unsuccessful treatment and may be the origin of acute flare ups during and after treatment.

Dealing with the canal morphology of the first maxillary premolars have revealed that it has two cusps with the buccal cusp prominently larger than the palatal cusp. Morphological variations in root consist of fused roots with separate canals, fused roots with interconnections or "webbing", fused roots with a common apical foramen and the unusual but always to be considered three-rooted tooth. In most instances they have two canals, although teeth with one or three canals do exist. Mariusz et al found 9.2% of first maxillary premolars with three canals.¹

The mandibular premolars are the most difficult teeth to treat endodontically.² This is because of the narrow cervix as compare to other teeth, and the large number

of possible variations of root canal anatomy. According to Green the highest incidence of 47% of accessory foramina was observed in mandibular second premolars.³ Rahimi et al. also reported high incidence of lateral canals that was of 38.7% and apical delta of 4.38% in mandibular second premolars.⁴

Vertucci et al. reported that the mandibular second premolar had one root canal at the apex in 97.5% and two canals in only 2.5% of the teeth; however, three root canals were scarce.⁵ Zillich and Dowson found the incidence of three canals in mandibular second premolars to be 0.4%.⁶ The clinician should be aware of these variations, their clinical and radiographic anatomy, and the location of orifices. Vertucci has classified root canal anatomy into 8 types. Sert and Bayirli in their study encountered fourteen new root canal configurations which were not included in the classification given by Vertucci or other classification systems.⁷

The purpose of these case reports is to discuss the treatment and diagnosis recommendations for an unusual occurrence of three canals in mandibular and maxillary premolars.

*Corresponding author.

E-mail address: dr.thimwala@gmail.com (A. Thimwala).

Comparative Evaluation of the Effect of Different Surface Contaminants on the Microleakage of two Different Generation Bonding Agents: An Invitro Study

Niket Kachhi^{1*} Milan Ughareja² Mihir Pandya³ Soham Patel⁴ Shashin Shah⁵ Akash Azad⁶

¹Senior Lecturer, Department of Conservative Dentistry and Endodontics, Goenka Research Institute of Dental Science, Gandhinagar, India

²Reader, Department of Conservative Dentistry and Endodontics, Goenka Research Institute of Dental Science, Gandhinagar, India

³Reader, Department of Conservative Dentistry and Endodontics, Goenka Research Institute of Dental Science, Gandhinagar, India

⁴Reader, Department of Conservative Dentistry and Endodontics, Goenka Research Institute of Dental Science, Gandhinagar, India

⁵Professor and Head, Department of Conservative Dentistry and Endodontics, Goenka Research Institute of Dental Science, Gandhinagar, India

⁶Senior Lecturer, Department of Conservative Dentistry and Endodontics, Goenka Research Institute of Dental Science, Gandhinagar, India

ABSTRACT

Aim: The aim of this in vitro study was to evaluate the microleakage of two different generation bonding agents in the presence of various surface contaminants.

Materials and methods: Class V cavities were prepared on 150 extracted human permanent molars. The samples were randomly divided into two main groups of 75 teeth each. Group I: Fifth generation bonding system (XP Bond). Group II: Seventh generation bonding system (Xeno V). Subgroups were formed according to exposure to different surface contaminants (saliva, blood, & haemostatic agent). Cavities were restored with nanocomposite (Ceram-X) and evaluated for microleakage. The scores were subjected to 't' test and ANOVA test.

Results: Both the bonding agents did not provide complete resistance to microleakage when there was no contamination. Microleakage was minimum in the no contamination subgroup and maximum with the haemostatic agent subgroup for both the groups. Xeno V was superior to XP Bond in bonding contaminated surfaces.

Conclusions: 7th generation bonding agent (Xeno V) showed less microleakage than 5th generation bonding agent (XP Bond) in presence of various surface contaminants used.

Keywords: Blood, Haemostatic agent, Microleakage, Saliva, Xeno V, XP Bond.

INTRODUCTION

There have been numerous advances in the generations of bonding agents, various techniques and its applications, since the last decade. According to Baren - "The way by which a composite resin adapts to the tooth substance depends more on the nature of the tooth surface than on the properties of the composite resin".^[1] In order to have successful adhesion between resin and tooth structure, it is necessary that the adhesive substrate should not be contaminated. Contamination at any step of the

bonding procedure can adversely impact the longevity of the restoration and decrease its clinical success.^[2] Contamination can lead to microleakage, which in turn leads to sensitivity, pulpal irritation, tooth discoloration, secondary caries and eventual loss of restoration and clinical failure.

MATERIALS AND METHODS

Sample selection

150 intact maxillary or mandibular extracted human permanent molar teeth were selected for the

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*Correspondence Dr. Niket Kachhi.

Department of Conservative Dentistry and Endodontics, Goenka Research Institute of Dental Science, Gandhinagar, India

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Effect of Different Finishing & Polishing Systems on the Surface Roughness of Composite Resins: An In Vitro Study

Milan Ughareja^{1*} Soham Patel² Mihir Pandya³ Bindi Pandya⁴ Utsav Patel⁵ Vaiभव Sharma⁶

¹Senior Lecturer, Department of Conservative Dentistry and Endodontics, Goenka Research Institute of Dental Science, Gandhinagar, Gujarat, India

²Senior Lecturer, Department of Conservative Dentistry and Endodontics, Goenka Research Institute of Dental Science, Gandhinagar, Gujarat, India

³Reader, Department of Conservative Dentistry and Endodontics, Goenka Research Institute of Dental Science, Gandhinagar, India

⁴Private Consultant, Department of Oral Pathology, Gandhinagar, Gujarat, India

⁵Private Consultant, Gandhinagar, Gujarat, India

⁶Senior Lecturer, Department of Conservative Dentistry and Endodontics, Tivani Institute of Dental Science Hospital and Research Centre, Bilaspur, Chhattisgarh, India

ABSTRACT

Background: Increasing environmental concerns and public demands for tooth coloured materials have heralded patients to demand the replacement of traditional metallic restorations by more esthetic & biocompatible materials. Search for an ideal esthetic material for restoring teeth has resulted significant improvement in both esthetic material and technique for using them. Composite resins have become the material of choice in both the anterior and posterior restorations considering the esthetics. However, among some of the problems associated with using resin composite restorations is surface roughness. Finishing and polishing procedures are essential to avoiding secondary caries, periodontal integrity, marginal integrity and wear reduction and contribute to longevity of the restoration by preventing the plaque accumulation on the surface of the restoration. Various improved finishing and polishing systems are available in market for the same purpose. But as an astute clinician one needs to evaluate the various polishing systems available to conclude their efficiency and results. The present study evaluates the efficiency three different finishing and polishing systems for composite resins.

Keywords: Evidence, Implantology, Periodontal disease

INTRODUCTION

It is a challenge for every aesthetic dentist to determine and replicate the appearance of teeth to mimic nature to its closest sense and form. The continuous development of aesthetically acceptable adhesive restorative material has made a variety of tooth colored materials available for clinical use². On the extreme ends of the continuum of direct tooth-colored restorative materials are conventional glass ionomer cements (GICs) and the resin composite¹. The advent of visible light polymerizing resin and the use of finer filler

particles permit resin composites to be polished to higher degree. Many researchers agree that regardless of the type of resin composite used, the smoothest surface imparted to resin composites occurs when they have been allowed to set against a Mylar strip and that any subsequent finishing and polishing procedures are detrimental to the surface of the composite restoration^{3,4}. But the matrix finished surfaces are polymer-rich and relatively unstable, hence this requires some degree of finishing and polishing¹. Therefore, the esthetic value of a composite restoration is dependent on

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*Correspondence: Dr. Milan Ughareja,

Department of Conservative Dentistry and Endodontics, Goenka Research Institute of Dental Science, Gandhinagar, India.

Email: Not Disclosed

Six Months Clinical Evaluation of Efficacy of Four Variable Percentages of Bleaching Agents with Different Modes of Activation in 30 Individuals: An In Vivo Study

Mihir Pandya^{1*} K C Ponnappa² Shweta Kumarswami³ Adarsh Desai⁴ Rahul Muchhadia⁵ Nehal Sheth⁶

¹Reader, Department of Conservative Dentistry, Goenka Research Institute of Dental Science, Gandhinagar, Gujarat, India

²Professor and Head, Department of Conservative Dentistry, Coorg Institute of Dental Science, Karnataka, India

³Principal, Professor and Head, Department of Prosthodontics, Goenka Research Institute of Dental Science, Gandhinagar, Gujarat, India

⁴Reader, Department of Oral Surgery, Goenka Research Institute of Dental Science, Gandhinagar, Gujarat, India

⁵Reader, Department of Orthodontics, Goenka Research Institute of Dental Science, Gandhinagar, Gujarat, India

⁶Professor, Department of Periodontology, Goenka Research Institute of Dental Science, Gandhinagar, Gujarat, India

ABSTRACT

Background: The use of in-office bleaching products with high concentration of hydrogen peroxide to bleach teeth was first reported in 1884. In 1918, Abbot described the chairside bleaching method, as it is known today using 35% hydrogen peroxide with heat and light to boost the oxidation reaction. Since then bleaching procedure became more popular and has also been proved successful in attracting the patients to seek such treatments. Following bleaching, patients often require additional esthetic intervention such as, application of laminates, veneers etc. to restore esthetic deficiencies. Current bleaching agents have eliminated the need of giving additional esthetic intervention to patients post-bleaching. Despite manufacturers claims and some optimistic statements, it is not known whether all bleaching products and techniques are equally effective. There are several bleaching materials available in the market claiming to provide best results. However the efficacy of these agents in the fluorosis endemic areas needs to be evaluated.

Hence, the present *in vivo* study was conducted to check the efficacy of various concentrations of hydrogen peroxide activated with different light activation sources in fluorosis endemic area of Rajasthan, India.

Keywords: Hydrogen peroxide, In-office bleaching, Power bleaching, Tooth bleaching, Vital tooth-bleaching, Fluorosis.

INTRODUCTION

This is an era in which there has been a tremendous interest of patients for cosmetic dental procedures. Public demand for aesthetic dentistry, including tooth whitening, has increased in the recent years. Patient interest in whitening and articles on tooth whitening in popular magazines suggest that tooth colour is a significant factor in the attractiveness of a smile. An attractive smile plays a major role in the overall perception of

physical attractiveness.^{1, 2} Studies confirm the importance of attractiveness on perceived success and self esteem.³

Discoloured dentition is a continuous source of emotional trauma to the patient. Discolouration can be extrinsic, which is associated with the absorption of material such as tea, coffee, red wine, some medication, iron salts, tobacco, and foods on to the surface of the enamel and in particular, the pellicle coating⁽⁴⁾, or intrinsic, where

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*Correspondence: Dr. Mihir Pandya,

Department of Conservative Dentistry, Goenka Research Institute of Dental Science, Gandhinagar, Gujarat, India.

Email: dr.mihirpandya@yahoo.com

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Treatment of Invasive Cervical Root Resorption by Non Vital Root Submergence: A Case Report

Mihir Pandya^{1*} Pooja Trivedi² Adarsh Desai³ Shweta Kumarswami⁴

¹Reader, Department of Conservative Dentistry, Goenka Research Institute of Dental Science, Gandhinagar, Gujarat, India

²Reader, Department of Conservative Dentistry, Narsinhbhai Patel Dental College & Hospital, Visnagar, Gujarat, India

³Reader, Department of Oral Surgery, Goenka Research Institute of Dental Science, Gandhinagar, Gujarat, India

⁴Principal, Professor and Head, Department of Prosthodontics, Goenka Research Institute of Dental Science, Gandhinagar, Gujarat, India

ABSTRACT

Background: Alveolar ridge resorption has long been considered an unavoidable consequence of tooth extraction. While the extent and pattern of resorption is variable among individuals, there is a progressive loss of ridge contour as a result of physiologic bone remodeling. Even today, with best modalities of tooth preservation, there is a group of elderly individuals who do not benefit from modern preventive practices and who now present a dilemma in terms of maintaining the masticatory apparatus necessary for nutrition. Even with excellent dental care, such patients experience abrasion of the natural tooth crowns with age, and embedded roots are left within the alveolar bone. According to old concepts of dental care, extraction of these roots would have been recommended, but today's goal of excellence in endodontics dictates otherwise. We report a case in which a non-vital root submergence was carried out to prevent alveolar ridge reduction.

Keywords: Alveolar bone resorption, endodontic treatment, retained roots, root submergence.

INTRODUCTION

Dentulism was once considered normal for anyone in their seventh decade of life, as was so eloquently declaimed by Jaques in Shakespeare's *'As You Like It'*: "sans teeth, sans eyes, sans taste, sans everything." Alveolar bone resorption has been defined as "a complex multifactorial oral disease governed by physical and physiologic laws". Little progress has been made concerning the etiology, treatment, and prevention of this disease. However, the one fact that cannot be disputed is that alveolar bone reduction is progressive and irreversible following tooth extraction.¹ Atwood and Coy found the mean reduction for the anterior maxillary to be a loss of 1 mm per year and for the anterior mandible, 0.4 mm per year. The only reliable method known to preserve alveolar bone is the maintenance of functioning healthy teeth.² In the practice of removable prosthodontics, much

attention is given to the preservation of the residual ridge. Regardless of what material, technique, or philosophy is used, the fate of the supportive bone is a major factor in the success of any denture. Bone continues to be a dynamic tissue that responds to function. The extraction of teeth eliminates the need for an alveolar process, and the bone is resorbed.³ The overdenture concept, which was developed in an effort to preserve alveolar bone by retaining

Endodontic treatment and root submergence of natural teeth, has become an accepted technique. However, the disadvantages of caries, periodontal disease, and high cost have plagued the overdenture concept. It was because of these disadvantages that a simpler method of root retention was sought resulting in the development of the submerged root concept.⁴ The genesis of the submerged root concept probably evolved from roots fractured and left behind during extraction,

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*Correspondence Dr. Mihir Pandya.

Department of Conservative Dentistry, Goenka Research Institute of Dental Science, Gandhinagar, Gujarat, India.

Email: dr.mihirpandya@yahoo.com