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From the MD's Desk



Dr. T.Ramesh, M.D.,
Correspondent

Heartfelt gratitude and best wishes to all of you. Our roots run very deep and strong. Students are a jumble of ingredients in need of a spark to bloom and flower when given the proper education. Adhiparasakthi Dental College and Hospital was founded to rekindle that spark, and the institute is a pioneer in dental education in India. Our institute's teaching, research, and performance standards, as well as the quality of hospital facilities and patient care, are among the finest in the nation. It is a source of great pride for us that our college has made sustained growth in academics, co-curricular activities, and high-quality patient care year after year.

We are delighted of the Institution's accomplishments as it enters its sixteenth year of service. Our mission is to provide high-quality education to as many individuals as possible. Today's society needs well-trained professionals to keep up with the rapid pace of change. Keeping this in mind, we strive to improve our quality of teaching and learning on a regular basis.

We are certain that the knowledge and skills a student gains from our institute will prepare them for a life of personal and professional success, allowing you to contribute to the enrichment of your family, society, and nation.

"An institution of higher education is a partnership among students and alumni, faculty and administrators, donors and trustees, neighborhoods and more, to build a community - and a culture" -Ben Sasse

Principal's Message



Dr.S.Karthiga kannan
Principal

My warmest best wishes to all of you. Adhiparasakthi Dental College is one of the premier institutions in the field of dentistry in India and has a reputation for attracting the best students. It is a great pride for us that our college has made consistent progress year after year in academic, co-curricular activities along with high quality patient care. As we strive innovational professional training to our students and effective treatment to our patients, we have employed highly qualified, dedicated and experienced faculty team which is supported by an excellent team of non-teaching staff.

At APDCH, we include professional education, curricular development and overall development of students by giving them advanced teaching methodologies which prepares them for global dynamic demand in the field of dental care. Our aim is to produce research-oriented dental professionals of the highest quality who are self-disciplined, honest and morally sound. We are proud that a good strength of our students excel in India as well as across the globe and have established themselves as good academicians and dental professionals and aboveall, they have proved themselves as responsible citizens by their service to the society.

I congratulate our staff members for their constant support and encouragement that they give to the students throughout their college life and guiding them not only in becoming a successful dentist, but also morally and socially conscious individuals. I wish all success to our staff, students and institution to achieve greater success in the field of Dentistry.

“If you are planning for a year, sow rice; if you are planning for a decade, plant trees; if you are planning for a lifetime, educate people”

There are many ways you can make an impact on the world. But there is no greater impact that you can make than spreading education, and empowering people who'll empower and teach people, who in turn, will empower and teach more.

EDITORIAL - PLAGIARISM AND ACADEMIC INTEGRITY IN PUBLICATIONS

Dishonesty and malpractice in research and publication, be intentional or not, goes much beyond an act of dishonesty. To understand 'what constitutes plagiarism' is a major confusion among young researchers, resulting in unintentional plagiarism.

The document published in The Gazette of India on July 31, 2018, defines plagiarism and the means to deal with it. The Government of India notified new regulations "Promotion of Academic Integrity and Prevention of Plagiarism in Higher Educational Institutions" which were adopted by the University Grant Commission (UGC). According to the new regulations, plagiarism is "the practice of taking someone else's work or idea and passing them as one's own."

The regulation further explains "(i) all quoted work reproduced with all necessary permissions and/or attribution, (ii) all references, bibliography, table of content, preface and acknowledgements, (iii) all generic terms, laws, standard symbols and standard equations" are not considered plagiarism.

Submitted manuscripts are routinely screened for the similarity index employing the software such as iThenticate®, Turnitin® and so on. This screening identifies similar texts from already published material and summates the total percentage. The present regulation relies on this percentage to quantify the plagiarism and to decide on the quantum of penalty.

Under the new guidelines up to 10% similarity is acceptable and terms it as minor or Level 0. The drawback is, this minor similarity could be a significant plagiarism if taken from a single source. The guidelines further quantify the degree of plagiarism as Level 1: Similarities above 10% to 40%, Level 2: Similarities above 40% to 60%, Level 3: Similarities above 60%. Based upon the level, students or researchers submitting their script face penalty.

Plagiarism is considered immoral act and not seen as a crime. Plagiarism problem is governed by the section 57, 63 and 63 (a) of the Copyright Act. Under these sections, plagiarism can attract imprisonment from 6 months to 3 years.

Creating awareness and education on scripting a good manuscript is imperative. Institutions and authors should have an easy access to good screening software for manuscripts. The responsibility of submitting an unblemished manuscript rest with the authors, researchers and guides.

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Contents

1. A PALATAL MASS OF OSSIFYING FIBROMA MIMICKING FIBROUS DYSPLASIA – A CASE REPORT	-	7
Ramanathan Vineeth, Subramanian Vasudevan Srinivasan, Jimsha Vannathan Kumaran, Professor, Mouttougichenin Surenthar,		
2. FUNGAL OSTEOMYELITIS OF MAXILLA (MUCORMYCOSIS) – A RARE CASE REPORT	-	12
Dr.shamalaravikumar S, Dr.dhivya K, Dr.devikak.v, Dr.priyadharsini J, Dr.deepika E		
3. A RARE VARIANT OF ODONTOGENIC NEOPLASM OF THE MAXILLA; A CASE REPORT	-	17
Dr. Hariprasath S, Dr. Durairaj D, Dr. Suresh Kumar, Dr. James Antony Bhagat M, Dr. Raj Prakash B, Dr. Nathiya B.		
4. APEXIFICATION WITH MTA AND BIODENTINE FOR MANAGEMENT OF OPEN APICES – A CASE REPORT	-	21
Dr. Preethiarchana S, Dr. Vasanthakumari A, Dr. Selvabalaji A, Dr. Dhivya S, Dr. Anagha C.		
5. PERCEPTION OF ONLINE CLASSES AMONG UNDERGRADUATE DENTAL STUDENTS IN MELMARUVATHUR DURING COVID-19 PANDEMIC – A CROSS-SECTIONAL STUDY	-	27
Kalaivani S, Shrijha G, Rajeswary K		
6. NOVEL RESTORATION OF MISSING LATERAL WITH LAMINATES – A CASE REPORT	-	31
Dr. Ashwini S, Dr. Prabhu K, Dr. Ponsekar A, Dr. Kiruthika S, Dr. ShakilaNazeenBanu U, Dr. Ramesh Karthick I.		
7. ENDODONTIC MANAGEMENT OF RADIX ENTOMOLARIS – ACASESERIES	-	35
Dr. G. SreeVidhya, Dr.E.Premkumar, Dr.BahavathiAnanthanHemasathya, Dr.NBharath, Dr.N.Senthilnathan.		
8. CONNECTIVE TISSUE GRAFT FOR ROOT COVERAGE	-	39
Dr.Kowsalya.N, Dr.Vigneshwaran, Dr.Santhiya.R, Dr. Dr.Pradeepkumar.Y, Dr. Sivasankari.T.		

A PALATAL MASS OF OSSIFYING FIBROMA MIMICKING FIBROUS DYSPLASIA – A CASE REPORT

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INTRODUCTION

Ossifying fibroma was first described by Menzel in 1872, but it was Montgomery who coined the term ossifying fibroma in 1927.(1)Makek suggested the term 'benign periodontoma'based on its origin(2).Intraoral ossifying fibromas have been described in the literature since the late 1940s.

Clinically these tumors manifest as slow growing intrabony mass that is normally well delimited and asymptomatic, though over time the lesion may become large enough to cause facial deformation. Most common site of occurrence for ossifying fibromas is the posterior region of the mandible and in the maxilla, usually in the area of the canine fossa and region of the zygomatic arch with the most common prevalence in females. The peak age of incidence for ossifying fibroma is the third and fourth decades of life(4). These FOLs often exhibit similar features in their clinical, radiographic and histological criteria, therefore leads to difficulty in diagnosis and management.

CASE REPORT

A 35 years old male patient reported to the Department of Oral Medicine and Radiology with chief complaint of swelling in the left upper posterior teeth region for past 6 months. The swelling was insidious in onset, painless and slow growing in nature. He also gave history of nasal blockage in left nostril. It was associated with difficulty in breathing and change in voice for past 10 months. There was no history of trauma, discharge, paraesthesia, or vision disturbances.

ABSTRACT :

Fibro-osseous lesions (FOLs) of the craniofacial bones comprise a group of lesions composed of hypercellular fibrous and osseous elements, which exhibit a wide spectrum of variations. Ossifying fibromas are rare, benign, nonodontogenic tumor that are seen in the head and neck region which form a part of the spectrum of FOLs of the jaw. This is a case report of maxillary ossifying fibroma with unusual clinical and radiological presentation.

Extra - oral examination showed no obvious facial asymmetry and deviation of tip of the nose to right side. On nasal cavity examination no evidence of elevation, growth or nasal discharge noticed, tenderness on palpation elicited over the left frontal and maxillary sinus area. No lymphadenopathy was detected.

Intra-oral examination revealed a single well defined swelling over the buccal and palatal aspect in relation to 24,25,26,27,28 with obliteration of buccal vestibule extending from 25 to 28 region. On the palatal aspect, anteroposteriorly it extends from distal side of first premolar to distal side of third molar, medially 0.5 cm crossing the midline, laterally 0.5 cm away from the marginal gingiva. The overlying mucosa appeared normal to adjacent mucosa with no visible pulsations and no secondary changes like sinus opening or surface ulcerations. On palpation, swelling was non - tender, firm to hard in consistency with bi-cortical expansion, non-compressible, non- reducible, non-pulsatile and non-fluctuant. Hard tissue examination revealed dental caries in the mesio-proximal aspect of 26, with tenderness on percussion present in relation to 25,26 with Grade II mobility in 26 and Grade I mobility in 27,28. A provisional diagnosis of odontogenic cyst and most probably radicular cyst in relation to 26 was given. Differential diagnosis of Ameloblastoma and its variants, fibrous dysplasia, Pleomorphic adenoma arising from minor salivary gland, malignancy involving maxillary sinus like squamous cell carcinoma and mucoepidermoid carcinoma arising from floor of the maxillary sinus were made.

INVESTIGATIONS

Routine hematological investigations revealed no significant findings.

VITALITY TEST :

Thermal vitality test was done from 18 to 28. No response was elicited in relation to 26,27 and delayed response in relation to 28 was noted. Immediate response were noted in the remaining teeth.

RADIOGRAPHIC EVALUATION :

Maxillary cross-sectional occlusal view revealed buccal cortical expansion from distal aspect of 26 with the posterior extent not covered. Homogenous radiopacity involving left maxillary antrum. Nasal septum deviated towards right side.

Orthopantomograph revealed periapical radiopacity extending from 23 mesial aspect to 28 distal aspect, periphery were blending well with the adjacent bone and root resorption in relation to 24, 25, 26, 27, 28 which was blunt in nature. Evidence of haziness in the left maxillary sinus when compared to the contralateral side was noticed. Coronal radiolucency on the mesial aspect involving enamel, dentin and close to pulp in relation to 26 with retained root stumps in relation to 35,45. No significant changes were noticed in remaining structures.

CT- Bone window Coronal section revealed a well defined hypodense and hyperdense region involving entire left maxillary sinus with involvement of three concha giving rise to dome shaped appearance. Border and periphery were well defined, corticated and intact. Corticated border in sinus give rise to double boundary. Multiple flecks of calcification was also evident.

CT Bone window axial section revealed mixed hypodense and hyperdense region involving entire left side maxillary sinus. Deviation of left side nasal septum was also evident.

Lesion aspiration done using 22gauge needle obtained few drops of blood-stained aspirate. The cytological examination of smear exhibited only blood cells and few area of broken cholesterol crystals. No odontogenic epithelium was noticed.

The excised specimen was sent for histopathological evaluation. Histological examination confirmed that the given section exhibited both soft and hard tissue mass. The soft tissue was predominantly fibrous in nature with areas showing plump fibroblasts and relatively less vascular in nature. Within the fibrous tissue there were round calcified structures which was homogenous in nature giving eosinophilic appearance. There was no evidence of mitotic abnormality of background fibroblastic cells and the histopathology of the lesion was suggestive of Ossifying Fibroma.

DISCUSSION

There are constant differences in terms of classification and diagnosis of fibro-osseous lesions in craniofacial area. All the lesions exhibit replacement of normal bone tissue with fibroblasts and collagen fiber tissue, with varying quantities of mineralized substances. Common fibro-osseous lesions of the jaws are following:

- Fibrous dysplasia
- Cemento-osseous dysplasia
- Focal cemento-osseous dysplasia
- Periapical cement -osseous dysplasia
- Florid cement -osseous dysplasia

Ossifying fibromas are encountered in the third and fourth decades of life which was evidenced in the present case too, the age of the patient was 35 years. Tumor shows female prevalence with ratio of 5:1 which was in contrast to the present case. The case reported has involved the left maxillary region which is quite uncommon. The lesion has extended to occupy entire left maxillary sinus and nasal cavity leads to significant functional disturbances such as difficulty in breathing and change in voice

OF predominantly affects the craniofacial bone and rarely involves the long bones. Of the craniofacial bones, the mandible is the most commonly involved site, typically inferior to the premolars and molars.⁽⁵⁾ Marx and Stern have stated that OF occurs frequently in the jaws, probably because these lesions are related to an extensive mesenchymal cellular induction into bone and cementum, required in odontogenesis. In the present case report, mass was observed in the maxilla, whereas, Chang et al.⁽⁶⁾ reported that 61% of the OF cases involved the posterior region of the mandible moreover this deviation could be because of variations in the number of cases available in earlier series when compared with the reports available around the world,⁽⁴⁾. However some studies reported the maxilla as the most common site of which was similar to the current case study.

A systematic review of 64 reports done by MacDonald-Jankowski found that 84% of cases displayed bucco-lingual expansion and 90% of maxillary cases involved the maxillary antrum which was similar in the present case.⁽⁷⁾ Swelling in the involved region is the most common clinical sign seen in OF patients. They were recognized only in routine radiographic assessment since they are painless swelling. Small lesions are asymptomatic and as they enlarge and develop they cause tumefaction i.e. regardless of significant facial asymmetry⁽⁴⁾. Pain and paresthesia are only rarely associated with ossifying fibromas. Mobility and root reabsorption of the teeth involved are frequent

finding and root divergence can be found in 17% of the cases. In the case reported here, the patient presented with no paresthesia, pain, root resorption or displacement of teeth.

The radiographic pattern for ossifying fibroma has been described by various authors. Early cases are small and may be radiolucent. As they enlarge and mature, they will become mixed radiolucent-radio opaque and then completely radiopaque. They are heterogenous because of inconsistent distribution of their osseous and fibrous components(8). Waldron and Giansanti (1973) had reported that OF showed lytic lesions in 26% of cases, 63% were lytic with radiopaque foci and 12% were diffuse and homogenous appearance. On contrary, Barberi et al (2003) categorized the radiographic pattern as defined lesion without sclerotic rim (40%), defined lesion with sclerotic rim (45%) and lesion with ill-defined border (15%).

Differentiation of ossifying fibroma and fibrous dysplasia is the diagnostic challenge due to marked histological and radiological overlapping features. Both lesions may exhibit similar clinical, radiographical and microscopic features. The most helpful feature in distinguishing the two lesion is the well circumscribed radiographical appearance of ossifying fibroma which can be separated from the normal bone.

Ossifying fibroma will exhibit spherical, centrifugal growth pattern, expanding equally in all directions which produces a round tumor mass. The lesion will displace adjacent structures with evidence of root resorption and will be delineated from the surrounding tissues. Whereas, Fibrous dysplasia has a fusiform pattern, margins blends with the surrounding bone, expanded cortex cannot be in exact parallel relationship thereby failing to produce a round tumor mass which is commonly seen in ossifying fibroma. Fibrous dysplasia will not be well demarcated and will form around adjacent structures rather than displacing them. Eversole et al suggested that ill defined margin of the fibrous dysplasia helps to differentiate from ossifying fibroma. The CT picture showed expanded cortical plates with thinning and intact margin, concluding the benign nature of the lesion. There was arching of the floor of the maxillary sinus which is a key diagnostic feature of Ossifying fibroma.

Histologically Ossifying fibroma is composed of lamellar bone with prominent osteoblastic rimming in dense fibrous tissues, proliferation of irregularly shaped calcifications. The calcifications are variable in appearance and represents stages of bone and cementum deposition. The typical microscopic finding of fibrous dysplasia consists of irregularly shaped trabeculae of immature bone in a cellular loosely arranged stroma, bony trabeculae are not connected to each other often assume curvilinear shape have been likened to chinese script writing. In contrast to ossifying fibroma,

fibrous dysplasia demonstrates a monotonous pattern throughout the lesion rather a haphazard mixture of woven bone, lamellar bone and spheroid particles.

The treatment of choice for Ossifying fibroma is surgical excision. Small and well demarcated lesions can be excised by enucleation and curettage because of recurrence rate. Whereas larger lesions show a more aggressive pattern especially in the maxilla require radical surgery with healthy margins.

The prognosis is good and reoccurrence rate of Ossifying fibroma is high. Eversole et al in a study of 64 cases of ossifying fibroma reported reoccurrence rate of high of 28% following surgical curettage. Lia et al observed that the time of reoccurrence was unpredictable ranging from 6 months to 7 year. Reoccurrence is higher in case of maxillary OF compared to the mandibular ones due to the greater difficulty of their surgical removal Therefore there must be long turn follow up period after the surgery. There is no evidence of ossifying fibroma undergoing malignant transformation radiotherapy is contraindicated because of its radio resistance and post radiotherapy complications. In the present case the recovery and prognosis is good and the patient is continuing to be tumor-free till date.

CONCLUSION :

OF and FD often presents a diagnostic dilemma for both clinicians and pathologists because of their radiographic and histological similarity. Differentiation of these two lesions is critical because the treatment protocols are quite different. Diagnostic modalities like conventional and specialized radiographs such as computed tomography assist in elucidating the location, expansion of cortical plates, internal architecture, Periphery of the lesion and the effect of the lesion on adjacent structures. OF, although benign, must be enucleated due to its potential to recur. FD is self-limiting and does not require treatment except for cosmetic reasons, pain, discomfort or impaired function. In FD the treatment, consists of recontouring or resection, should be delayed until after cessation of skeletal growth, since early treatment may accelerate growth of the lesion. Ossifying fibroma comprises entities with different morphological features that can be mistaken for other benign fibro osseous lesions, this diagnostic dispute leads to multidisciplinary approach such as clinical, radiological and pathological aspects for a early diagnosis, treatment planning and follow up.

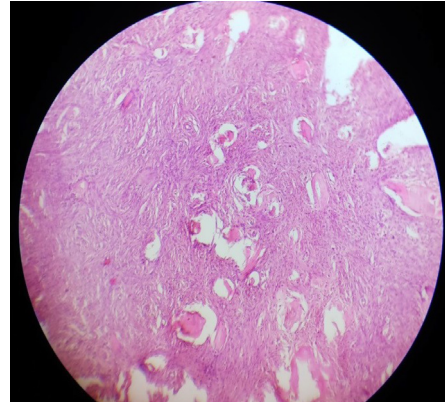
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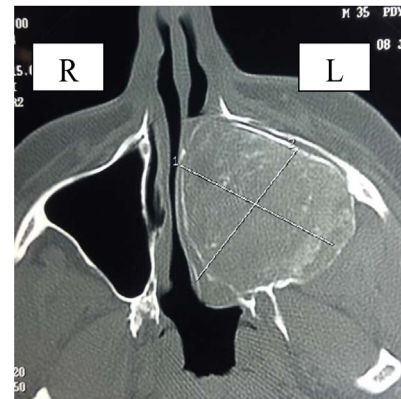
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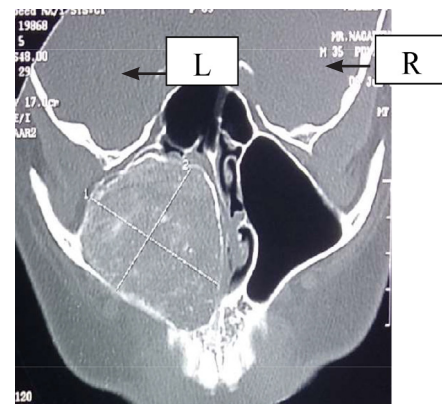
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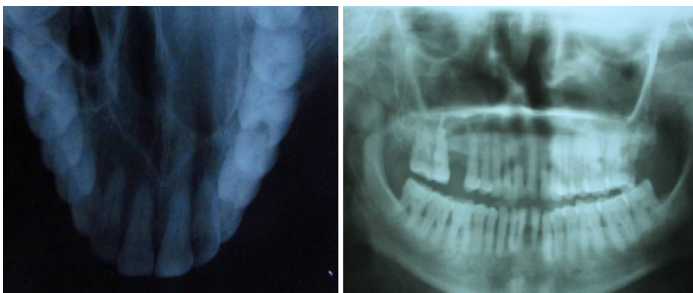
Computed Tomography Coronal Section



INTRAORAL SWELLING



Preoperative intra oral view
showing expansion of the palatal cortex in
relation to 24, 25, 26 region



Maxillary cross Sectional occlusal
Radiograph Opg Showing Radio Opaque lesion
Over Left Side Of Posterior Maxillary Region

Post-Operative Clinical Picture Taken After 8 Months



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FUNGAL OSTEOMYELITIS OF MAXILLA (MUCORMYCOSIS) – A RARE CASE REPORT

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ABSTRACT :

Osteomyelitis involving maxilla is less frequent than mandible, due to its rich vascularity. Fungal osteomyelitis is frequently encountered in the nose and paranasal sinuses of the orofacial region and diabetes mellitus is usually a propagating factor which provide a suitable environment for the growth of the fungus. Mucormycosis also referred to as Phycomycosis or Zygomycosis is a systemic fungal infection caused by Mucor species in patients with immune or metabolic disorders and they gain access into the body through breached skin, mucosa, nose and tooth extraction sockets. Here, we present a case of a 45-year-old male patient who presented with a chief complaint of pain and swelling in the right upper anterior teeth region with a history of uncontrolled diabetes mellitus. Several investigations like OPG, CT and routine blood tests were carried out and based on histopathology, a final diagnosis of maxillary fungal osteomyelitis (mucormycosis) was given.

INTRODUCTION :

Osteomyelitis derived from the Greek word 'osteon' meaning bone, 'myelo' meaning marrow, and 'itis' meaning inflammation is defined as a chronic inflammatory condition of the medullary cavities, haversian system and adjacent cortex of bone. The term "Osteomyelitis" was coined by Nelaton in 1844. Maxilla is rarely affected compared to mandible and the possible etiology of maxillary osteomyelitis are bacterial infections, fungal infections (Candidiasis and Mycormycosis), viral infections (Herpes zoster) and also due to trauma, radiation, surgical intervention, long-term use of antibiotics or corticosteroids.¹ Candida, Aspergillus, Rhizopus and Fusarium are opportunistic fungal pathogenic species which remain avirulent in healthy individuals and cause severe fungal infections in patients with declined immunity due to AIDS, diabetes mellitus, neoplastic disease, those undergoing organ, blood and marrow transplantation and on long standing immunosuppressant drugs.²

Mucormycosis is an opportunistic systemic fungal infection caused by the fungi belonging to the class Zygomycetes and order Mucorales. Rhizopus, Mucor, Absidia, Saksenaea and Cunninghamella are the five genera responsible for causing mucormycosis in humans.³ Since there is a continuous increase in uncontrolled diabetes in India, the occurrence of mucormycosis has also increased in the recent years.¹ The humid climate and

high temperature in India provides a favourable environment for the growth of this fungi and may contribute to the prevalence of the disease.¹

CASE REPORT :

A 45 year old male patient visited our institution with a chief complaint of pain and swelling in the right upper anterior teeth region since one month. Patient gave a history of continuous, lancinating type of pain which aggravated on lying down position and got relieved gradually. Patient gave a medical history of diabetes and is on medication. Past dental history revealed that patient had an access opening done in right maxillary central incisor for root canal treatment. Extra oral examination revealed a diffuse swelling in the upper lip, extending from bridge of the nose to the vermilion border of the upper lip and a generalized swelling was seen involving the upper anterior and posterior region. On intraoral examination, multiple ovoid swellings involving the gingiva was observed measuring 0.7×0.8 cms in size in relation to 11, 12 and 13 region with pus discharge (Figure 1). A palatal swelling was seen extending from 14 to 17 region measuring 3×2 cms and also a nodular lesion measuring 1×1 cm was seen in the midpalatal region with sinus discharging pus (Figure 2). On palpation, the palatal swelling was soft and tender. Orthopantomogram X-ray revealed radiolucency involving the roots of the maxillary anteriors. A provisional diagnosis

as periodontal abscess was reported based on the clinical and radiographic findings following which 11,12 and 13 were extracted and the patient was advised medication.

The sinus opening with pus discharge in the mid palatal region persisted even after extraction and medication. CT scan of the facial bones revealed mucosal thickening involving maxilla bilaterally, left sphenoid and right ethmoid sinuses. Focal areas of bone resorption with associated cortical breach was noticed involving all walls of the right maxillary sinus, medial wall of left maxillary sinus and right medial and lateral pterygoid plates. (Figure 3). Based on the CT findings a diagnosis of Fungal sinusitis with secondary osteomyelitis of hard palate and maxilla suggestive of mucormycosis was given. Hematological investigations revealed a hemoglobin level of 12 gms/dL. Biochemical investigations showed bizarre values (Fasting Glucose level- 151mg/dL, 2 hr Glucose PP- 213 mg/dL, Glucose random- 459 mg/dL, HbA1C- 12.2%).

A series of microbiological investigations were carried out and the results were unsatisfactory to make a conclusion. Acid Fast Bacilli staining was negative and Gram's staining revealed plenty of pus cells and microorganisms. No fungal elements were observed in Potassium Hydroxide (KOH) wet mount. Fungal culture was negative even after 13 days of incubation. Incisional biopsy was done under local anesthesia and few bits of soft tissues from gingiva and the sinus lining in the mid palatal region were submitted for histopathological examination (Figure 4).

The H & E stained soft tissue sections of the incisional biopsy revealed areas of granulation tissue with numerous neutrophils, eosinophils, lymphocytes, plasma cells and macrophages. Scattered within the connective tissue were few multinucleated giant cells (Figure 5). Hence, based on the clinical and histopathological findings, it was reported as chronic inflammation.

The excisional biopsy specimen consisted of multiple bits of hard (portion of maxilla with teeth) and soft tissues in 10% Neutral Buffered Formalin (Figure 6). Hard tissue was decalcified in 5% Nitric acid and processed. Histopathology of decalcified bone sections revealed areas of necrotic bone. (Figure 7). Areas of granulation tissue with haematoxyphilic fungal hyphae (arrow) were seen in decalcified bony sections (Figure 8,9). Few sections revealed haematoxyphilic fungal hyphae (arrow) gaining access to blood vessels (Figure 10). Hence, a final diagnosis as Fungal Osteomyelitis (Mucormycosis) was made based on the histopathological examination.

DISCUSSION :

Mucormycosis is a fungal infection caused by the members of mucorales and zygomycotic species.⁴ *Rhizopus oryzae* is the

causative agent isolated from 70% of the cases diagnosed with mucormycosis.⁵ It most commonly affects immunocompromised individuals and the risk factors include uncontrolled diabetes, renal insufficiency, steroid usage, neutropenia, organ or stem cell transplantation, AIDS, old age etc.⁴ In recent times, the incidence of mucormycosis found to be increasing in Indian population which probably can be attributed to the elevated number of people with uncontrolled diabetes.¹ Also, the sultry and humid climatic conditions in our country provide a suitable environment for the growth of the fungus.¹

Mucor species is contracted in humans through inhalation or contaminated wounds.⁶ One of the characteristic features of *mucor* species is angioinvasion through induced endocytosis.⁶ The central mechanism of endocytosis occurs by binding of invasins expressed on the fungal hyphae to glucose-regulated protein, GRP78 expressed on the surface of endothelial cells leading to intravascular thrombosis and tissue infarction.⁶ GRP78 is a heat shock protein present in the endoplasmic reticulum.⁵ It has been reported that mRNA levels of GRP78 have been elevated in the lungs and brain in diabetic ketoacidosis patients.⁶ *Mucor* species gain access through an area of ulceration or an extraction socket in the oral cavity chiefly in immunocompromised patients.⁴ Fungal spores form elongated invasive structures called hyphae in the host which will pierce tissue barriers owing to the turgor pressure at their tips.⁷ *Mucor* species also sense and follow curvatures of a surface by a mechanism called thigmotropism.⁸ Individuals with defective phagocytic function are more prone for mucormycosis infection which results in increase of the hyphae levels in the blood vessels (angioinvasion), one of the characteristic features of mucormycosis leading to ischemia, thrombosis, infarction and tissue necrosis.^{5,7}

In mammalian hosts, iron is bound to carrier proteins, such as transferrin, ferritin, and lactoferrin.⁵ It has been reported that the binding of iron to transferrin is inhibited in diabetic ketoacidosis resulting in elevated iron levels.⁵ Thus, the acidic pH (7.3–6.88) in serum with free iron facilitates the growth of *mucor* species such as *R. oryzae*. Fungi possess high-affinity iron permeases or chelators (siderophores).⁵ The high-affinity iron permeases reduce ferric into the more soluble ferrous form. Recently, gene encoding high-affinity iron permease (FTR1) is found to be expressed in *R. oryzae* which is suggested to be a crucial virulence factor in mucormycosis.⁵ Rhizoferrin, a siderophore secreted by *rhizopus* also supplies iron through a receptor-mediated process.⁵ Also in *R. oryzae* FTR1 may act as a cytoplasmic membrane permease which promotes the uptake of heme. Intracellularly heme is degraded by hemeoxygenases which release ferric ion.⁵

Mucormycosis is the third most common fungal infection

after candidiasis and aspergillosis.⁹ It can be rhinocerebral, pulmonary, cutaneous, gastrointestinal, disseminated and miscellaneous forms.¹⁰ Superficial mucormycosis are commonly encountered in skin, external ear and fingernails.¹¹ Rhinocerebral mucormycosis are most commonly seen in diabetic patients with ketoacidosis.¹¹ It causes infection of paranasal sinuses that may extend to the brain, orbit, intra-cranial structures resulting in blindness, seizures, cavernous sinus thrombosis often followed by death if left untreated.^{10,11} Rhinocerebral forms also show neurotropism causing perineural invasion.¹² According to Syeda Neelam Afroze et al. (2017), mucorales species gain access to the maxillofacial region through the extraction wounds, especially when the patient is immunocompromised.¹³ This feature is in accordance with our case report where our patient is a diabetic and had a history of extraction. But according to Manickam Selvamani et al. (2015), this extraction etiology cannot be concluded as there is no literature evidence to support this hypothesis.¹⁴ In hyperglycemia, chemotaxis is compromised and phagocytic efficiency is impaired which favours the growth of mucor species acid-rich environment which probably could have been the propagating factor in our case too.¹³

On radiographic examination, OPG revealed radiolucency involving the roots of maxillary anterior teeth which made the clinicians to arrive at a provisional diagnosis of periodontal abscess in relation to 11,12,13. After extraction, CT scan of facial bones revealed mucosal thickening involving the paranasal air sinuses. Irregular bony sclerosis and focal areas of bone resorption was seen in maxillary sinus and pterygoid plates. CT findings were in favour of secondary osteomyelitis of hard palate and maxilla, suggestive of mucormycosis. Hematological investigation revealed a hemoglobin level of 12 gms/dL and Fasting Glucose level of 151mg/dL, 2 hr PP Glucose PP of 213 mg/dL, Glucose random-459 mg/dL, HbA1C- 12.2%.

Microbiological investigations such as AFB staining, Gram's staining and KOH mount failed to reveal any fungal microorganisms. Also in our case, no fungi could be cultured even after 13 days of incubation. This could be because fungal cultures are reported to be positive only in 50% of cases as suggested by Walsh TJ et al. (2012).¹⁵ Hyphae are delicate or friable in nature and hence it could have been damaged during grinding or homogenization of tissue specimens which may have lead to negative results in our case.^{14,15} Though, it has been found that Mucorales species are angioinvasive, yet the blood cultures were reported to be negative in most of the cases.^{14,15}

In our case report, the histopathology of excised bone decalcified sections revealed areas of necrotic bone and hematoxyphilic fungal hyphae along with areas of granulation

tissue. The hematoxyphilic fungi were broad, aseptate with obtuse angled branching and some filaments showing angioinvasion strongly suggest that the microorganisms were Mucor species as reported by Pandey, A et al (2011) in their publication.¹⁶

CONCLUSION :

Candida and mucor species of fungi which are normal residents of oral microbial flora cause lesions of the maxillofacial tissues as opportunistic infections during lowered immune conditions. Fungal osteomyelitis of maxillofacial tissues have been rarely reported as jaw bone infection. The incidences are usually related to uncontrolled hyperglycemia, immunodeficient conditions and individuals under immunosuppressive medications. Recently frequent fungal osteomyelitis of jaw bone has been reported due to concomitant mucormycosis in post COVID19 cases. However, the present case has been reported prior to the emergence of COVID19 pandemic and the cause of the fungal osteomyelitis is related to uncontrolled diabetes mellitus. Hence, our case experience will guide the general dental surgeons and oral surgeons, the diagnosis and management of fungal osteomyelitis of jaw bones.

Figure: 1 Multiple ovoid swelling in relation to 11, 12, 13 region with pus discharge



Figure: 2 Diffuse palatal swelling extending from 14 to 17 region with nodular whitish sinus opening with pus discharge in the midline of the palate



Figure: 3 Focal areas of bony resorption with associated cortical breach in all walls of right maxillary sinus, medial wall of left maxillary sinus, right medial and lateral pterygoid plates.

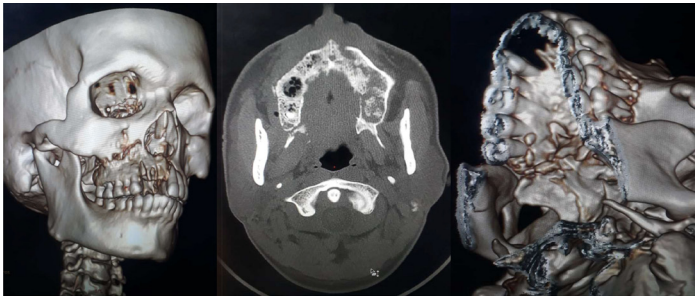


Figure: 4 Incisional biopsy specimen



Figure: 5 Areas of granulation tissue with neutrophils, eosinophils, lymphocytes, plasma cells, macrophages and giant cells (H&E10X)

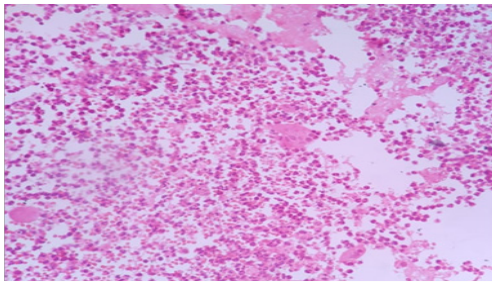


Figure : 6 Excisional biopsy specimen



Figure : 7 Areas of necrotic bone within an area of granulation tissue and necrosis (H&E 10X)

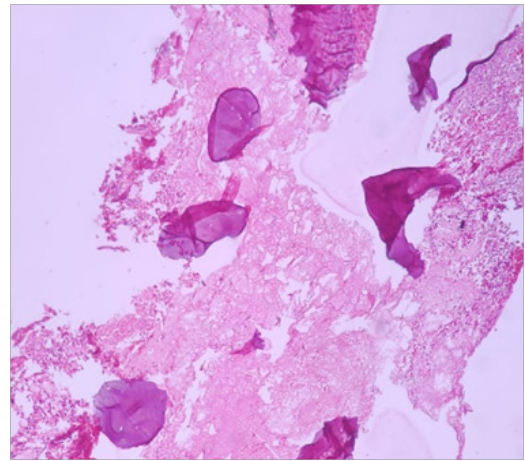


Figure : 8 Areas of granulation tissue with haematoxyphilic fungal hyphae (arrow) (H&E 40X)

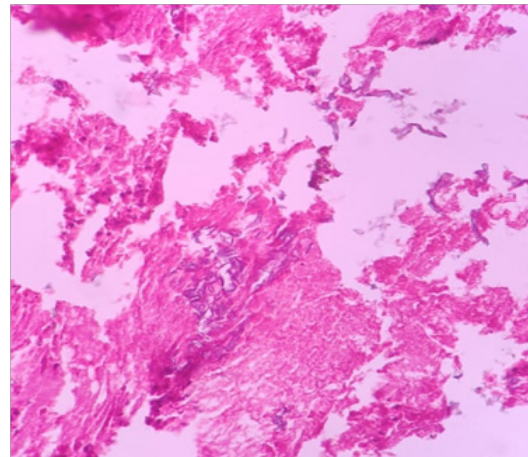


Figure: 9 Areas of necrosis, necrotic bone (arrow) haematoxyphilic fungal hyphae in sections (arrow) (H&E 40X)

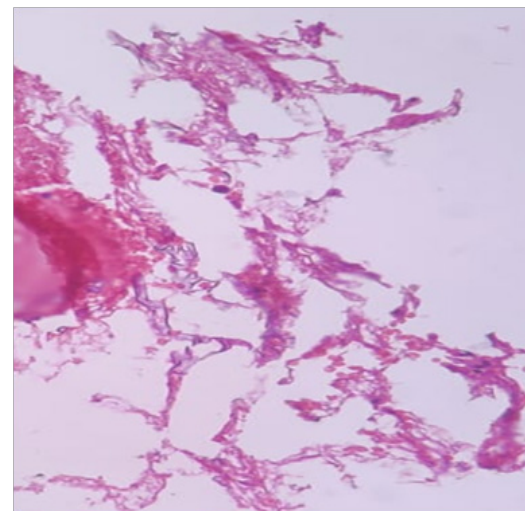
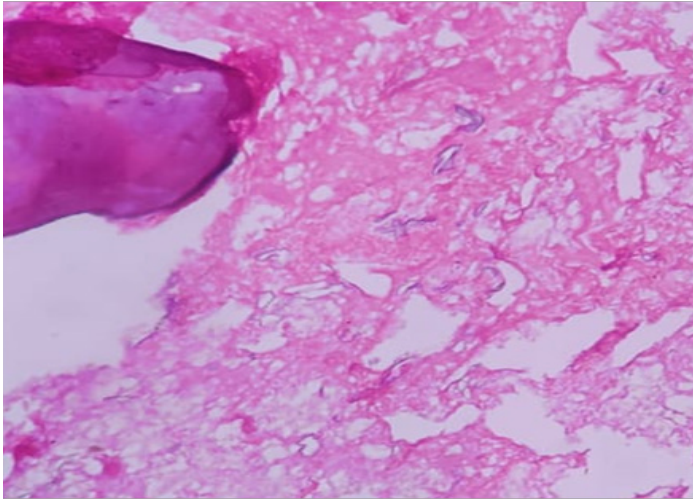


Figure : 10 Areas of necrosis, necrotic bone, haematoxyphilic fungal hyphae in sections (arrow) gaining access to blood vessels (H&E 40X)



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A RARE VARIANT OF ODONTOGENIC NEOPLASM OF THE MAXILLA; A CASE REPORT

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INTRODUCTION :

Odontogenic myxoma is of mesenchymal origin and is considered to be a rare variant of odontogenic neoplasm. It is commonly found all over the body especially at the sites of the skin, subcutaneous tissue, heart, and also in the head and neck region⁽¹⁾. Myxomas in maxilla and mandible occurrence are more prone to odontogenic origin. The literature says Odontogenic Myxomas occur between 3% to 10% of all odontogenic neoplasms⁽²⁾. Histopathologically, it is a spindle or stellate-shaped variant. They may have presented with more amount of collagen may be termed as myxofibroma. Radiographically, there was a unilocular to multilocular radiolucency transformation occurred. Odontogenic Myxomas exhibits aggressive infiltration to the adjacent soft and hard tissues and also it is not encapsulated⁽³⁾. Although, complete surgical removal of Odontogenic myxoma is quite complicated. There was a high chance for recurrence and may transform into a malignant one. Though, radiographical assessment and histopathological interventions are more important to establish

ABSTRACT :

Odontogenic myxoma is of mesenchymal origin which is a rare variant of odontogenic neoplasm. It is commonly found all over the body. The literature says Odontogenic Myxomas occur between 3% to 10% of all odontogenic neoplasms. Histopathologically, it is a spindle or stellate-shaped variant. They may have presented with more amount of collagen may be termed as myxofibroma. Radiographically, there was a unilocular to multilocular radiolucency transformation occurred. Odontogenic Myxomas exhibits aggressive infiltration to the adjacent soft and hard tissues. Although, complete surgical removal of Odontogenic myxoma is quite complicated. There was a high chance for recurrence and may transform into a malignant one. Though, radiographical assessment and histopathological interventions are more important to establish and to do impeccable surgical management. The surgical treatment was the segmental resection with intact borders and radical resections for the more aggressive lesions. In this case report, Odontogenic Myxoma of the maxilla was presented with multilocular variety in the posterior region. This has been managed surgically with good outcome.

and to do impeccable surgical management. The surgical treatment was the segmental resection with intact borders and radical resections for the more aggressive lesions^(4,5).

CASE REPORT :

A 17 years old male patient reported to the Department of Oral and Maxillofacial surgery, Adhiparasakthi dental college and hospital, Melmaruvathur presented with swelling on the right side of the face for the past 1 month. It is asymptomatic and gradually progresses. On General and systemic examination, the patient was good. Extraorally, evident swelling in the right maxillary region. There was no paresthesia, nasal obstruction, or breathing difficulty noted. Intraorally, Swelling extent from mesial aspect of 14 to distal aspect of 16. Retained deciduous 55 and missing 15 seen. On Radiographical examination, there is a multilocular radiolucency present at the right maxilla along with impacted 15 near the roof of the right maxillary sinus. Computed tomography reveals, there is a cortical expansion with bony erosions appreciated. The differential diagnosis for this feature

is predictive of Ameloblastoma or Adenomatoid odontogenic tumour. As we had done an incisional biopsy under LA and got with the histopathological report of Odontogenic myxoma. Furthermore, the lesion is a more aggressive one and more prone to recur. Excisional biopsy with adequate margins was carried out under GA immediately without any delay. Complete resection and extraction of involved teeth 14, 55, 16 and an impacted 15 also have been removed. The patient is under follow up for a Good oral rehabilitation procedure.

Fig.1. Pre-Operative Profile Picture



Fig.2. Intraoral Picture



Fig.3 Pre-Operative Orthopantomogram



Fig.4 Computed Tomography



Fig.5 Exposed Lesion



Fig.6 Resected Site**Fig.7** Post-Operative Orthopantomogram

DISCUSSION :

Rudolf Virchow coined the term myxofibroma in 1863, for a group of tumours that had a histologic resemblance to the mucinous substance of the umbilical cord. OM was first mentioned in the literature by Thoma and Goldman in 1947^(6,7). In 1948, Stout redefined the histologic criteria for myxomas as true neoplasms that do not metastasize and exclude the presence of chondroblasts, lipoblasts, and rhabdomyoblasts.

In 1992, WHO classified Odontogenic Myxomas for histological typing of odontogenic tumours: A benign tumour, which is of ectomesenchymal origin with or without the presence of odontogenic epithelium. Traditionally, Odontogenic Myxomas are involving tooth-bearing areas associated with an unerupted tooth with histological resemblance to dental mesenchyme (dental papilla, follicle or periodontal ligament) and the sporadic presence of islands of odontogenic epithelium. In our case, there was a

resemblance with impacted premolar in which the odontogenic myxoma originates. As an osseous entity, however, Odontogenic myxomas of the jaws are considered as slow-growing tumours with the potential for extensive bone destruction, cortical expansion, and a relatively high recurrence rate⁽⁸⁾.

Most of the odontogenic myxomas occur in the second and third decades of life. According to Lu et al.,⁽⁹⁾ 52% were located in the mandible and 48% were located in the maxilla. Sixty-five percent of the cases were located at premolar–molar region.

Most often Odontogenic myxomas are slow-growing, painless and cause facial swelling leads to facial asymmetry. Growth may be rapid with infiltration of adjacent soft tissue structures. It may present as heaviness, swelling of the cheek or palate, malocclusion or loosening of teeth. Displacement of teeth usually occurs. Ulceration of the overlying oral mucosa occurs only when the tumour interferes with dental occlusion. When the maxillary sinus got involved, often fills the entire antrum. They may still involve the palate, orbit, and nasal cavity, causing symptoms associated with these structures. In severe cases, nasal obstruction or exophthalmos may be the leading symptoms⁽¹⁰⁾. Radiographically, larger multilocular lesions are more common in the posterior areas of the jaws and unilocular lesions are mostly located in the anterior. The radiographic tumour margins may be either well-defined or poorly defined⁽¹¹⁾. On conventional radiographs, OM presented varying radiographic appearances, ranging from unilocular to multilocular (including honeycomb, soap bubble and tennis racquet patterns); with involvement of the local alveolar bone or maxillary sinus and sometimes osteolytic destruction with or without osteogenesis. Many reviews suggest that there may be no correlation between the borders of the lesion and the number of bony trabeculae within the lesion, but maxillary tumours were more likely to be ill-defined compared with mandibular lesions. According to some studies, root displacement rather than resorption is the rule of jaw myxomas⁽¹¹⁾.

Recently, CT and magnetic resonance imaging examinations were applied in many works of literature and it may present as bony expansion and thinning of cortices with strong enhancement of the mass lesion in the maxilla. In the case of the maxillary sinus, bone destruction, thinning and strands of fine lace-like density representing ossifications may be seen.

Differential diagnoses include ameloblastoma, odontogenic keratocyst, central giant cell granuloma, intraosseous hemangioma, aneurysmal bone cyst, glandular odontogenic cyst, fibrous dysplasia, metastatic tumour in multilocular cases and in cases of unilocular lesions, periapical, lateral, periodontal and simple bone cysts⁽¹¹⁾. In older patients, the possibility of malignancy should be ruled out. The radiographic appearance of a unilocular type of Odontogenic Myxoma was similar to that of

the odontogenic cyst and unilocular ameloblastoma.

Microscopically, it resembles the mesenchymal portion of a tooth in development⁽¹²⁾. The lesion is not encapsulated and exhibits the abundant extracellular myxomatous stroma of ground substance and thin fibrils characterized by a proliferation of a few rounded cells, fusiform or star cells and spindle-shaped cells. It may have a complete myxomatous tissue or varying proportions of myxomatous and fibrous tissue. In the latter case, it can be designated either as odontogenic fibromyxoma, in which the myxomatous element predominates; or odontogenic myxofibroma, with a predominance of fibrous tissue. Small islands of odontogenic epithelial tissue can be found scattered in the stroma, sometimes being surrounded by a narrow zone of hyalinization.

Recommended therapy varies from curettage to radical excision. Complete surgical removal can be difficult as the lesion is not encapsulated especially in the maxilla because the myxomatous tissue infiltrates adjacent bone tissue as well as the close proximity of vital structures and more complex anatomy. The prime reason for recurrence is thought to be related to incomplete removal rather than the intrinsic biologic behaviour of the tumour. These characteristics may explain the high rate of recurrence of myxomas, which ranges from 10% to 33% with an average of 25%^(7,8). Although there are few studies regarding this, radiotherapy and chemotherapy appear to be ineffective in controlling the recurrent lesions. It is suggested that patients be followed closely for at least 2 years because this is the most likely time for recurrence.

CONCLUSION :

In our case of Odontogenic Myxoma of the maxilla was presented with multilocular variety in the posterior region. With respect to biological behaviour and extensiveness of such lesion, we should go with a diagnosis and treat the patient with a correlation of clinical and radiographical appearance also with histological interference. These are mandatory for such lesions to avoid controversies and to reach the final diagnosis and prevent further recurrences.

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APEXIFICATION WITH MTA AND BIODENTINE FOR MANAGEMENT OF OPEN APICES – A CASE REPORT

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ABSTRACT :

Aim: To assess the Endodontic management of open apex using Biodentine and MTA as an apical matrix.

Methodology: The management of an immature tooth with pulpal necrosis and periapical pathology poses a great endodontic challenge. The conventional apexification using calcium hydroxide has certain drawbacks such as the need for long term therapy to enable barrier formation. The recent trend is to form a fragile dentinal bridge as an artificial apical stop. This case report observes apexification and successful healing with the use of Biodentine and MTA as an apical barrier matrix in root end apexification procedure. Biodentine™ is new calcium silicate based cement that exhibits physical and chemical properties similar to those described for certain Portland cement derivatives. This article demonstrates the use of the newer material, Biodentine and MTA as an apical matrix barrier in root end apexification procedure. This case report presents apexification and successful healing with the use of Biodentine and MTA as an apical barrier matrix.

Conclusion: Apexification is one step procedure using an apical plug of Biodentine and mineral trioxide aggregate. Both can be considered as a predictable treatment choice for apexification.

INTRODUCTION :

Traumatic injuries to young permanent teeth affect 30% of children. These injuries often result in pulpal inflammation or necrosis and subsequent incomplete development of dentinal wall and root apices ^[1].

In the past, techniques for management of non-vital teeth with open apex were confined to custom fitting the filling material and apical surgery ^[2].

A number of authors have enlightened the use of rolled cone technique with custom fitted gutta-percha cones, but due to the wider apical portion of the root than its coronal portion, proper condensation of the gutta-percha is impossible to get. Adequate widening of the coronal segment to make its diameter greater than the apical portion will weaken the root and increase the risk of fracture. The disadvantages of surgical intervention include the difficulty of obtaining the necessary apical seal in

the young pulpless tooth due to its thin, fragile, irregular walls at the root apex; which will destroy during preparation or during condensation of the filling material. Thus the wide foramen results in a large volume of filling material and a compromised seal ^[3].

Apicoectomy further reduces the root length resulting in a very unfavorable crown root ratio. The limited success enjoyed by these procedures resulted in noteworthy concern in the phenomenon of continued apical development or formation of an apical barrier which was first proposed in 1960s. Many techniques have been suggested for induction of apical closure in pulpless teeth to produce more favorable conditions for conventional root canal filling. But the treatment of choice for necrotic young permanent teeth is considered to be apexification ^[4].

According to American Association of Endodontists, Apexification is defined as a method to induce a calcified barrier in a root with an open apex or the continued apical development

of an incomplete root in teeth with necrotic pulp^[5].

The most commonly advocated medicament is calcium hydroxide. Calcium hydroxide when mixed with camphorated parachlorophenol (CMCP) will induce the formation of a calcified barrier across the apex. Calcium hydroxide can be mixed with a number of different substances (camphorated mono chlorophenol, distilled water, saline, anesthetic solutions, chlorhexidine and cresatin) to induce apical closure^[4]. Limitations of calcium hydroxide apexification are long time-span of the entire treatment, multiple visits needed requiring patients cooperation and increased clinical costs, increased risk of tooth fracture using calcium hydroxide as a long-term root canal dressing. These shortcomings led to the utilization of mineral trioxide aggregate to fill the apical end without the need for calcific barrier formation^[6].

It produces apical hard tissue formation with significantly greater consistency than calcium hydroxide and also helps in the formation of bone and periodontium around its interface^[7]. Various authors have reported clinical success using MTA for one-visit apexification. The major disadvantage of MTA is its manipulation due to which its placement in the wide apical area is difficult to achieve and long setting time, poor handling characteristics, high cost^[8].

Biodentine™ is a new calcium silicate based cement of the same type as MTA. It exhibits physical and chemical properties similar to those described for certain Portland cement derivatives^[9]. Based on all its properties, Biodentine™ has been claimed to be a bioactive dentin substitute for the repair of root perforations, apexification and retrograde root filling by the manufacturers. A modified powder composition, the addition of setting accelerators and softeners, and a new predisposed capsule formulation for use in a mixing device, largely improved the physical properties of this material making it much more user-friendly with a shorter setting time^[10].

The mechanical properties of Biodentine are similar to those of natural dentine. The compressive strength, elasticity modulus and microhardness are comparable with that of natural dentine. The material is stable, less soluble, non – resorbable, hydrophilic and easy to prepare and place, needs much less time for setting, produces a tighter seal and has greater radiopacity. Due to its improved material properties, Biodentine has a distinct advantage over its closest alternatives in treatment of teeth with open apex^[11].

Placement of Biodentine as apical plug is technique-sensitive. Restricting the material to the confines of the root apex is crucial. Sealing material extruded periapically may set before it disintegrates and gets resorbed. This might result in the persistence of the inflammatory process, which may complicate or even prevent repair of the tissue^[12].

The present case report is about the comparative effect of MTA and Biodentine apexification in a single patient with open apex in relation to #11 and #21.

CASE DISCUSSION :

A 10-year-old female patient reported to OPD of Department of Pediatric and Preventive Dentistry at Adhiparasakthi Dental College and Hospital with a chief complaint of fractured teeth in the upper front region of the jaw since last 3–4 months. The patient gave a history of fall 6 months back in school. At the time of trauma patient had pain and consulted outside clinic and took medications. Patient feels esthetically affected. The medical history of the patient was noncontributory.

The extra oral examination revealed no abnormalities and the intraoral examination revealed complicated crown fracture in #11 and #21. Both #11 and #21 were tender on percussion. Pain on palpation was felt in both central incisors. The teeth were not mobile and normal probing depth of about 3mm is present.

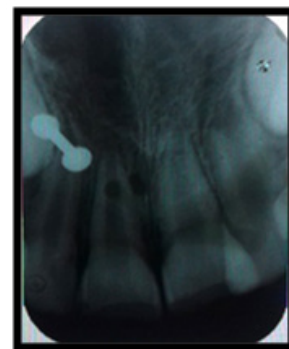
Figure 1:



Preoperative view – Complicated crown fracture in #11 and #21

Pulp vitality test with electric pulp tester (EPT) showed that #11 and #21 were non vital. Radiographic examination of #11 and #21 reveals wide canals with open apex and periapical radiolucency.

Figure 2 : Pre-operative radiograph – Open apex of #11, #21



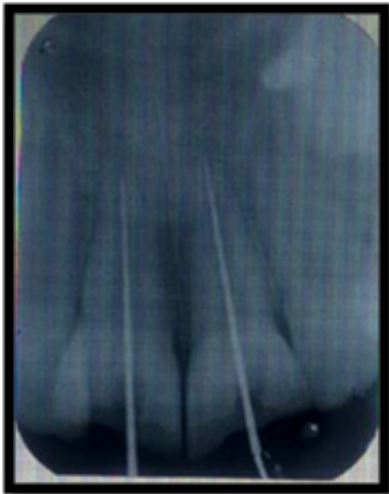
Various treatment procedures were explained to the patient and apexification was planned as a treatment option for #11 and #21. Single visit apexification with MTA and biodentine in each tooth was planned and consent was taken before the start of the procedure.

The tooth was anesthetized with 2% Lignocaine containing 1:200,000 adrenaline (Lox 2%) and rubber dam (GDC, Natural Latex Dental Dam) was applied. An endodontic access was prepared using Endo Access bur. BMP was done till 80 K file (MANI, IMC). Irrigation was performed with 2% sodium hypochlorite and normal saline (Lifeparteurolife). After determination of working length for #11 and #21 by radiograph, cleaning and shaping was done. Intracanal dressing with 3mix antibiotics were given for 1 week and access cavity was temporized with temporary restoration using cavit (Insta Temp seal).

Figure 3 : Rubber dam application



Figure 4: Working length determination



After 1 week the provisional restoration was removed. Irrigation and circumferential filing was done to remove 3mix antibiotic paste circumferential from the canal. The canal was completely dried with size 80 absorbent paper point (2% Impress).

Suitable pluggers (MANI, IMC) were selected to condense MTA and biodentine. MTA (MTA Cem, nexo bio) was mixed with distilled water to a consistency of wet sand and condensed with light pressure in the apical region of the canal in #11 using

prefitted hand pluggers. Wet sterile cotton was placed in the canal above MTA. The tooth was then given a temporary restoration with cavit.

Biodentine (Septodont) capsule was tapped on a hard surface to diffuse the powder. After this, five drops of manufacturer's supplied liquid was dispensed into the capsule. The capsule was then placed in triturator for 30s. After mixing, biodentine was placed at the apical region of #21. The material was then condensed with suitable prefitted plugger until apical region of the canal was filled with biodentine. After that the tooth was given temporary restoration with cavit.

On next day appointment obturation was done in the tooth #11 and #21 using guttapercha (Diadent GP points) and ZOE as sealer. On recall visits the patient was asymptomatic and then post endodontic restoration with composite was done.

The patient was kept on 1, 3, 6, 9, 12 months follow up.

Figure 5: Apexification with MTA and biodentine



Figure 6: Obturation in #11, #21 with GuttaPercha

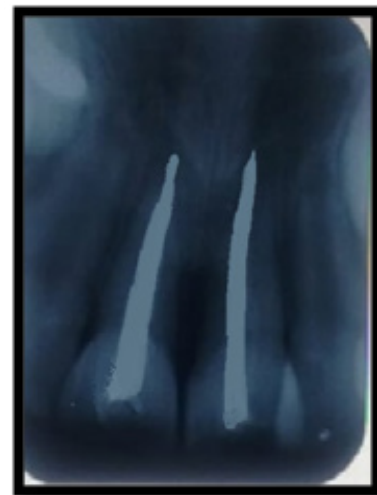
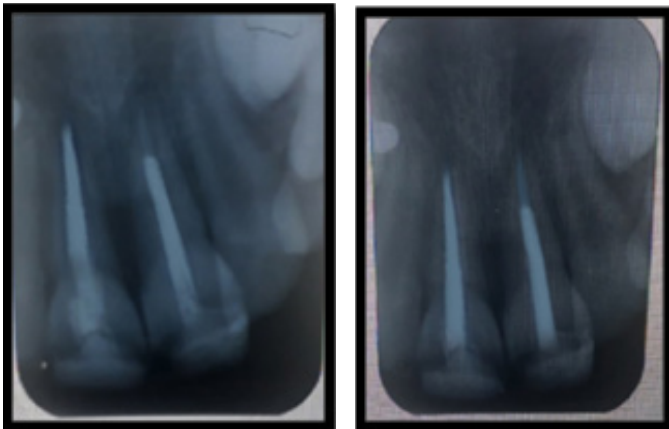


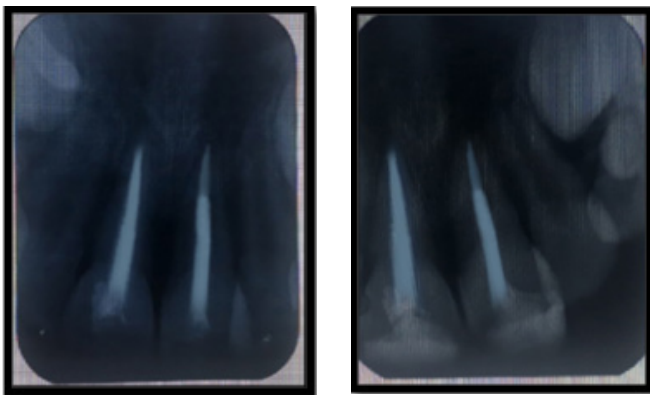
Figure 7: Follow up radiographs

Follow up of the patient was done during 1, 3, 6, 9 and 12 months.



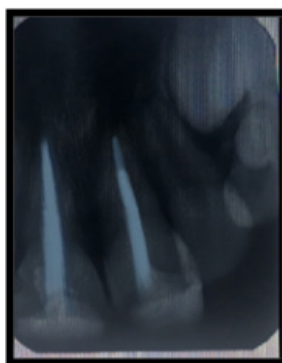
a. One month follow up

b. Three months follow up



c. Six months follow up

d. Nine months follow up



e. Twelve months follow up

DISCUSSION :

Injury to the tooth can have many clinical and radiographic manifestations. Pulpal changes, periradicular inflammation, and incomplete development of root apex can occur. Blunderbuss canals poses a threat because thin dentinal walls are more prone to fracture.

Management of open apex can have multiple options such as apexification, apexogenesis, or revascularization technique. Apexogenesis is treatment to preserve vital pulp tissue in the apical part of a root canal to complete formation of root apex^[13]. Therefore, apexogenesis is only possible when some vital pulp is remaining. However, it was not possible in this case as both #11 and #21 had necrotic pulps.

Most of these techniques involve removal of the necrotic tissue followed by debridement of the canal and placement of a medicament. However, it has not been conclusively demonstrated that a medicament is necessary for induction of apical barrier formation. Nygaard-Ostby put forward that laceration of the periapical tissues until bleeding occurred might produce new vital vascularized tissue in the canal. He suggested that this treatment 'may result in further development of the apex'^[14]. Moller et al suggested that removal of the infected pulp tissue should create an environment contributing to apical closure without use of a medication^[15]. McCormick et al have theorized that debridement of the root canal and removal of the necrotic pulp tissue and microorganisms along with decrease in pulp space are the critical factors in apexification^[16]. A number of authors have described apical closure without the use of a medicament. Some believe that instrumentation may slow down root development thus preparation of these canals should be done cautiously. Cooke and Robotham hypothesize that the remnants of Hertwig's epithelial root sheath, under favorable conditions, may organize the apical mesodermal tissue into root components. They advise avoidance of trauma to the tissue around the apex^[17].

Revascularization technique has an advantage of formation of pulp dentin complex. It establishes defense mechanisms of pulp. Long-term follow up and uncertainty of results is a disadvantage. Revascularization causes thickening of dentinal walls^[18] which was not needed in this case due to the fact the canal wall thickness was sufficient.

Thus apexification is considered the choice of treatment in this case. Calcium hydroxide has been considered as an efficient material for apexification^[19]. This material has several disadvantages such as apical closure in relationship to treatment time is unpredictable, an increased risk of tooth fracture, and poor patient compliance with follow-up due to the extended treatment time, all of which can affect treatment outcomes^[20]. The most promising alternative to calcium hydroxide is MTA^[21].

The advantages of MTA material are (i) reduction in treatment time, (ii) immediate restoration of the tooth, (iii) no adverse effect on the mechanical properties of root dentin. In a prospective study, apexification treatment with MTA showed a high prevalence of healing and apical closure^[22]. The main disadvantage of MTA is its discolouration potential, difficult

handling characteristics. Placement of the material in a wide open area is a challenging task and also there is a risk of extruding this expensive material into periapical tissues.

Thus a new material called biodentine was introduced to overcome the disadvantages of MTA. Biodentine is a calcium silicate-based material in which the powder component is mainly tricalcium silicate, dicalcium silicate, calcium carbonate, zirconium dioxide and liquid is calcium chloride in aqueous solution with an admixture of polycarboxylate^[23].

Setting reaction is hydration reaction. Hydration of tricalcium silicate produces a hydrated calcium silicate gel and calcium hydroxide. The set mix consisting of unreacted tricalcium silicate grains are surrounded by layers of calcium silicate hydrated gel, which are relatively impermeable to water. The setting time of biodentine is 12 minutes^[23].

Advantage of biodentine is that it does not stain tooth, it has micromechanical bonding so no surface preparation is required, and its microleakage resistance is enhanced by absence of shrinkage due to resin-free formulation and the material's biocompatibility^[23].

According to the case report given by Khetarpal A et al (2014) the apexification procedure in single step using an apical plug of Biodentine is considered as a predictable treatment choice and an alternative to mineral trioxide aggregate apexification^[24].

According to the invitro study conducted by Bani et al (2015) on the efficacy of Biodentine as an apical barrier and concluded that the apical sealing ability of Biodentine was similar to MTA at any apical plug thickness^[25].

In the case report given by Elumalai D et al (2015) on the use of Biodentine and MTA for apexification and they concluded that MTA and biodentine being bioactive dental materials can be successfully used for root end closure of open apices. Host response was same in both teeth and biodentine showed better initial healing while MTA had better long-term effect^[26].

Jaikaria A et al (2019) uses Biodentine and MTA for single visit apexification and considered it as an effective treatment option for teeth presenting with open apices which is similar to the present case report, however they concluded that biodentine showed better initial healing while MTA had better long term effect^[27].

The present case uses biodentine and MTA for apexification to treat root end closure. The patient was asked to report for 12 month follow up which includes 1month, 3month, 6month, 9month and 12month. The apex of the root in relation to #11 and #21 in this present case was wide open. But during follow up root end closure was slowly evident and also patient was asymptomatic. At the end of 12month follow up, the root end

closure was satisfactory in both the tooth.

CONCLUSION :

Biodentine and MTA had almost similar success rates as an apical barrier in immature permanent teeth. The shorter setting time and easier handling of Biodentine may make it a preferred alternative to MTA. However, clinical trials with longer follow-up periods with more case series are required before any conclusive recommendations can be made.

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PERCEPTION OF ONLINE CLASSES AMONG UNDERGRADUATE DENTAL STUDENTS IN MELMARUVATHUR DURING COVID-19 PANDEMIC – A CROSS-SECTIONAL STUDY

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Keywords :

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ABSTRACT :

Introduction:

The COVID-19 pandemic has led to closure of the educational institutions which ultimately affected the education of large number of students. Most of the universities switched their traditional classroom lectures to online mode so as to keep on the learning progress for their dental students. However, information on students' attitudes toward online courses during the COVID-19 pandemic is still limited. The present study aims to assess the undergraduate dental students' perspectives on the implementation of online learning due to COVID-19, using a questionnaire survey. Materials and methods: The present

Background :

The COVID-19 pandemic has a certain influence on various walks of life around the world. This pandemic led to the suspension of all in-person educational activities and demanded alternative strategies for propagation of education.¹ As per UNESCO report 2020, by the end of April, 186 countries have implemented nationwide closure of educational institutions, which affected about 73.8% of the student population.² Many educational institutions were closed to break the chain of disease transmission, which ultimately affected large number of students. The educational institutions and students are trying new ways to complete their curriculum in a stipulated time frame.³ Though these attempts are met with inconvenience, they have also prompted digital innovations in providing education. Nevertheless, COVID-19 has initiated the institutions to pursue creative approaches in a relatively short notice.⁴

cross sectional study was conducted among the undergraduate students of Adhiparasakthi Dental College and Hospital during May and June 2021. A 20 item self-administered closed-ended questionnaire was developed and distributed to 450 undergraduate dental students of the institution. Statistical analysis: Descriptive statistics was used to summarize the results and chi-square test was used to analyze the association between year of study and perception of online classes. Results: A total of 304 students responded to the survey among which 233 were female and 73 were male. Around 31% of the participants were IV year BDS students, followed by Interns (21.4%), III year (20.7%), II year (18.1%) and I year (9.2%). Around 67% of study participants agreed that regular classes at college are more helpful for their learning. Many students gave a positive response for combination of traditional teaching and online tutorials. When asked about the confidence level of appearing for examination after attending only online classes, nearly 38.8% of the participants gave a neutral response. A significant association was found between year of study and hours spent online, perception that online classes were interactive and helpful. Conclusion: The present study population were of the opinion that combination of online and traditional lectures will benefit their learning. A change in the perception of students and an increased learning control is essential to make the individuals believe that technology provides them with better information.

Dental education is affected by this pandemic due to limited clinical exposure to the students. Most of the universities switched their traditional classroom lectures to online mode so as to keep on the learning progress for their dental students. The shift to online mode has been an abrupt one due to unprecedented lockdown with minimal time to design and adopt the course contents for online mode.⁵ Thus, it is imperative to assess the status of online education regarding the internet use, online platform, mode of presentation and student's participation. In this context, the online experience of students can be utilized to make virtual learning easy, efficient and productive.⁴ However, information on students' attitudes toward online courses during the COVID-19 pandemic is still limited. The present study aims to assess the undergraduate dental students' perspectives on the implementation of online learning due to COVID-19, using a questionnaire survey.

Materials and Methods :

The present cross sectional study was conducted among the undergraduate students of Adhiparasakthi Dental College and Hospital during May and June 2021. A 20 item self-administered closed-ended questionnaire was developed with Google Forms and was distributed through various social networking sites to all the 450 undergraduate dental students of the institution. The questionnaire comprised of sections on demographic information, practice on use of online modalities and perception of the respondents on online education. The responses were recorded on a 5-point Likert scale ranging from score of "1" representing "Strongly disagree" and a score of "5" representing "Strongly agree." All the questions were related to the teaching-learning process in general, content delivery, professor-student interaction, assessment and social impact of online education. The collected data was entered in Microsoft Excel spreadsheet and statistical analysis was done using SPSS version 20. Descriptive statistics was used to summarize the results and chi-square test was used to analyze the association between year of study and perception of online classes.

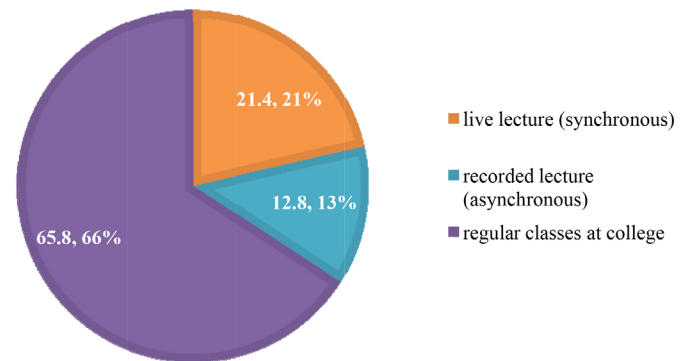
Results :

Among the 450 students a total of 304 students responded the survey with a response rate of 65.7% participated in the study among which 233 were female and 73 were male. The participants were aged between 17-20 years (41.4%), 21-24 years (57.9%), 25-28 years (0.7%). Around 31% of the participants were IV year BDS students, followed by Interns (21.4%), III year (20.7%), II year (18.1%) and I year (9.2%). Almost 95.1% of the students used mobile phone for attending their online classes. Table 1 shows the distribution of study participants based on gender, age group and year of study.

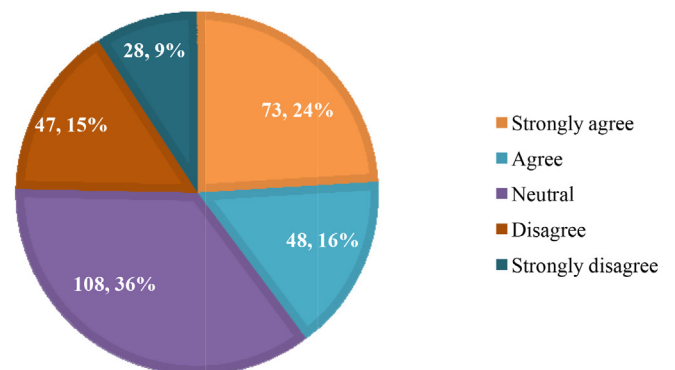
Table 1: Distribution of study participants based on gender, age group and year of study

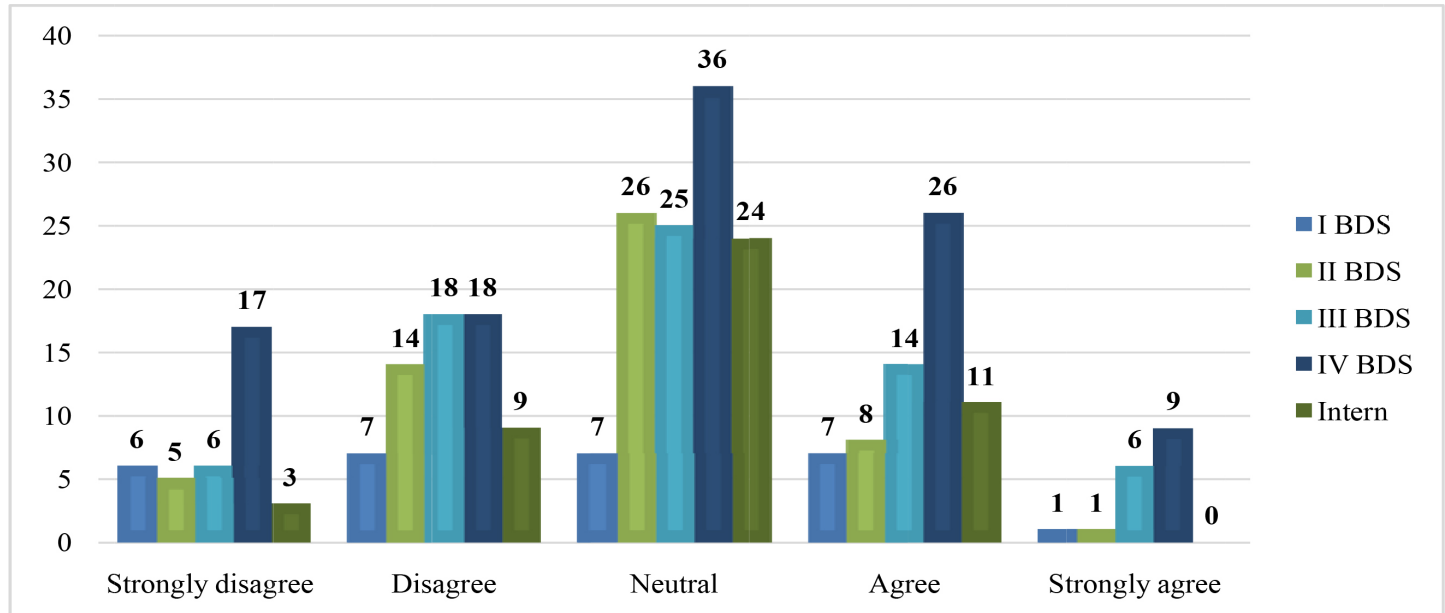
		n (%)
Age group	17-20 years	126 (41.4)
	21-24 years	176 (57.9)
	25-28 years	2 (7)
Gender	Male	71 (23.4)
	Female	233 (76.6)
Year of study	I BDS	28 (9.1)
	II BDS	55 (18.1)
	III BDS	63 (20.7)
	IV BDS	93 (30.6)
	Intern	65 (21.4)

Graph 1: Distribution of study participants based on type of class useful for learning



Graph 2: Distribution of study participants preferring a combination of traditional teaching and online tutorials



Graph 3: Distribution of study participants based on confidence of attending examination**Table 2:** Distribution of study participants based on year of study

		I BDS n(%)	II BDS n(%)	III BDS n(%)	IV BDS n(%)	Intern n(%)	Total n(%)	p-value
How many hours do you spend every day online?	< 1 hour	3(1)	12(3.9)	3(1)	8(2.6)	12(3.9)	38(12.5)	<0.001
	1-2 hours	13(4.3)	23(7.6)	23(7.6)	30(9.9)	16(5.3)	105(34.5)	
	2-3 hours	5(1.6)	15(4.9)	18(5.9)	39(12.8)	8(2.6)	85(28)	
	3-4 hours	5(1.6)	2(0.7)	21(6.9)	23(7.6)	6(2)	57(18.8)	
	> 4 hours	2(0.7)	2(0.7)	4(1.3)	6(2)	5(1.6)	19(6.2)	
Do you feel that online classes are interactive?	Strongly dis- agree	0(0)	5(1.6)	7(2.3)	10 (3.3)	0(0)	22(7.2)	<0.001
	Disagree	2(0.7)	7(2.3)	12(3.)	25 (8.2)	6(2)	52(17.1)	
	Neutral	7(2.3)	26(8.6)	26(8.6)	38(12.5)	16(5.3)	113(37.2)	
	Agree	5(1.6)	6(2)	15(4.9)	24(7.9)	13(4.3)	63(20.7)	
	Strongly agree	14(4.6)	10(3.3)	9(3)	9(3)	12(3.9)	54(17.8)	
Do you feel that online classes are helpful?	Yes	12(3.9)	38(12.5)	53(17.4)	79(26)	19(6.2)	201(66.1)	<0.001
	Maybe some- times	12(3.9)	14(4.6)	12(3.9)	19(6.2)	24(7.9)	81(26.6)	
	No	4(1.3)	2(0.7)	4(1.3)	8(2.6)	4(1.3)	22(7.2)	
Do you feel that online class needs improvement?	Strongly dis- agree	6(2)	13(4.3)	19(6.2)	23(7.6)	9(3)	70(23)	0.120
	Disagree	7(2.3)	11(3.6)	13(4.3)	35(11.5)	14(4.6)	80(26.1)	
	Neutral	4(1.3)	24(7.9)	27(8.9)	29(9.5)	14(4.6)	98(32.2)	
	Agree	6(2)	3(1)	7(2.3)	11(3.6)	7(2.3)	34(11.2)	
	Strongly agree	5(1.8)	3(1)	3(1)	8(2.6)	3(1)	22(7.2)	

Discussion :

During the COVID-19 pandemic, online learning helped in continuation of education that was disrupted in person. Students were involved in their online lectures by engaging themselves with internet access.³ In the present study, response rate is 65.7%, which is similar to study by Abbasi et al.⁶ Surveys which are conducted through online platforms are reported to show lower response rates compared to hand distributed surveys.⁷ The present study population found regular classes to be more useful (66%) than online classes similar to the study by Abbasi et al⁶ (77%). Most of the present study participants were not confident in attending examinations after attending online classes alone similar to the previous study by Schlenzet al⁸, in which many students did not feel well prepared for practical courses with online learning alone. Besides theoretical education, dentistry requires manual training and clinical patient care; therefore, “face-to-face” teaching is important.⁸ However, the previous study by Cheng et al¹, showed contrary results as most students had positive attitudes toward changing on-site learning to online learning and thought that online courses were better than on-site courses. A top-down action with proper institutional and administrative support, training the faculty and students will be useful to achieve a well-aligned e-learning implementation program.⁹

Most of the present study population (37.2%) gave neutral response that the online classes were interactive similar to the previous study by Muthuprasad et al⁴ and Peng et al.¹⁰ who concluded that interactivity, convenience and flexibility were identified as the strength of online classes. Interactive e-learning initiatives can be developed by designing the environment and technology to facilitate the creation of social presence.¹⁰ A learning environment that encourages peer to peer and peer to instructor interaction will make the online classes more successful.⁸ More than 65% of the study participants found the online classes to be helpful, similar to the previous studies.⁵⁻¹²

Around 32% of the present study population gave a neutral response when they were asked if online classes needed improvement and is similar to study by Abbasi et al.⁶ A few limitations of online learning like Lack of connectivity, Data limit, Data speed, Little/no face to face interaction, Lack of device, Poor learning environment and Technophobia should be considered to avoid such issues in the future.^{4,5}

Conclusion :

Online learning has its own ups and downs in dental education as person-to-person interactions with patients is mandatory for diagnosis and treatment. This interaction cannot be conveyed online or via web. Online learning will be useful to promote deeper learning among students by integrating active learner-centered learning, if utilized in a proper way. The present

study population were of the opinion that combination of online and traditional lectures will benefit their learning. The students should be motivated to leverage the technology to control their learning environment. A change in the perception of students and an increased learning control is essential to make the individuals believe that technology provides them with better information.

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NOVEL RESTORATION OF MISSING LATERAL WITH LAMINATES – A CASE REPORT

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partial veneer , fixed partial denture

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INTRODUCTION:

The fundamental requirement in restorative dentistry is to re-establish the form, function and esthetics.[1] Conservation of the remaining tooth is key to success in fixed partial denture. Conservative tooth preparation should provide acceptable clearance and uniform reduction for necessary thickness of the final restoration.[2] Porcelain laminate veneers has gained popularity nowadays because of its conservative tooth preparation and its impressive esthetics.[3]

Careful patient selection is utmost important for veneer preparation. Indication of Dental veneer includes, correction of minor malposition, restoring fractured and worn teeth, discoloured teeth due to tetracycline staining, fluorosis, amelogenesis imperfecta and others.[4,5,6] Contraindication of dental veneer includes edge to edge relationship, poor oral hygiene, parafunctional habits like bruxism and insufficient enamel.[7,8]

Ceramic laminate veneers are considered to be conservative and esthetic alternative for anterior teeth.[9] This clinical report describes a unique method includes replacement of single missing anterior tooth with fixed partial denture supported by veneers on the abutment teeth.

CASE HISTORY :

A male patient aged 18 years presented to Adhiparasakthi Dental college and Hospital with chief complaint of missing anterior teeth. The clinical and radiographic examinations revealed the loss of one maxillary lateral incisor, Ellis class -I fractured central incisor and deep bite(fig 1). The abutment teeth

ABSTRACT:

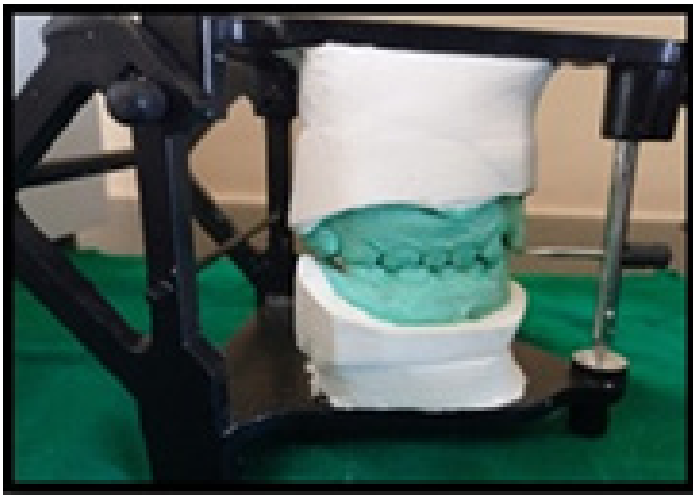
Preparing the teeth to receive a fixed prosthesis is still a challenging procedure due to pulp exposure, over tapering and minimal retention. Conservative tooth preparation is the key to success for fixed partial dentures. Veneers are considered as the most conservative fixed prosthesis because it requires minimum tooth preparation when compared to the full coverage crowns with excellent esthetics. This clinical report describes the replacement of single missing anterior tooth with fixed partial denture supported by veneers on the abutment teeth.

were intact with healthy periodontium. Patient's medical status review was non-contributory. Patient's dental status did not reveal contraindication to veneers. By considering patient's age minimal tooth preparation was decided to prevent exposure of the pulp and longevity. Veneer retained FPD, conventional FPD, and implants were the treatment options presented to the patient for replacement of the missing teeth. The patient expressed preference for veneer retained FPD rather than implant and conventional FPD because no surgical procedure was needed and tooth preparation is also more conservative. Porcelain veneers was selected to satisfy the esthetic demand of the patient.

Fig 1. Facial Pre-Treatment



Primary impressions were taken with alginate impression material. Casts were poured with Type-1 Dental stone(Fig 2) and articulated in Three point articulator (Fig 3). Before fabrication of veneer retained FPD, tooth mock-up was done and definitive waxing was accomplished on a diagnostic cast to demonstrate to the patient (Fig 4). The patient was satisfied with the final waxing. Informed consent were obtained.

Fig 2. Primary casts**Fig 3. Articulated casts****Fig 4. Wax-up**

Many reduction guides, based on the diagnostic wax-up were fabricated. Putty guide (ZhermackSpA) to evaluate the tooth reduction and clear matrix guide for provisional restoration were fabricated using thermoplastic sheet(Fig 5).

Fig 5. Clear matrix

Minimal tooth reduction was done on the facial aspect of maxillary right central incisors and canine. After minimal tooth reductions were completed, teeth were polished and corners were rounded using discs(Fig 6). Double-cord impression technique was used and the final impression was made using putty and light body (Virtual 380, IvoclarVivadent).

Fig 6. Tooth reduction

Temporary restoration was given using clear matrix guide with Luxatemp material (Fig 7). Ceramic veneers along with pontic were fabricated out of Lithium disilicate (IPS E.max press, Ivoclarvivadent)(Fig 8). Ceramic restoration was treated with hydrofluoric acid surface treatment(IPS ceramic Etching Gel, IvoclarVivadent) for 15 seconds. Tooth surface was treated with 32% phosphoric acid gel for 20 seconds and then rinsed and gently dried¹⁰. Primer was applied followed by light curing for 20 seconds. Final restoration was luted with resin cement followed by light curing for 20 seconds. Occlusion, excursive movements and protrusion were checked. Patient was pleased with the final restoration(Fig 9,10).

Fig 7. Clear Matrix in place



Fig.8 Fabrication of veneer retained FPD

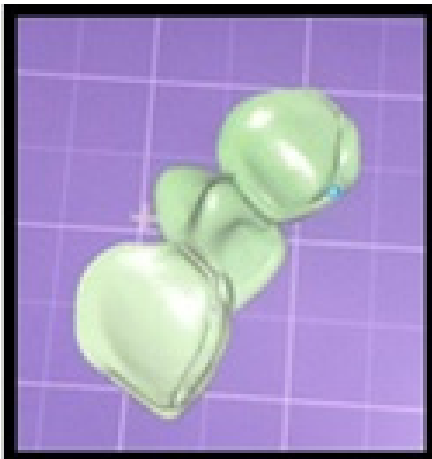
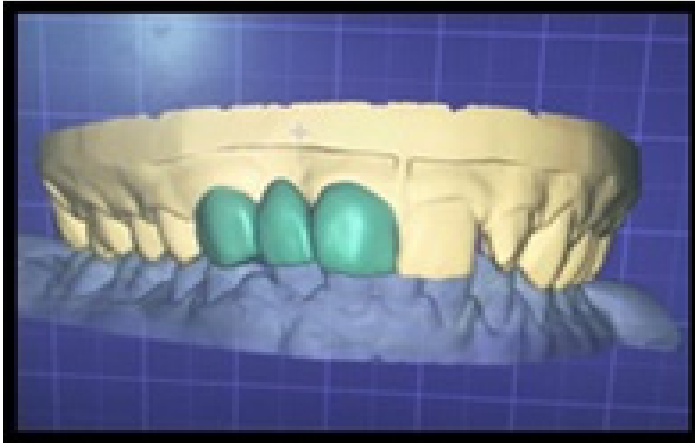


Fig. 9 Final restoration (facial)



Fig. 10 Final restoration (Incisal)



Discussion :

Proper treatment planning, conservative tooth preparation and ideal ceramic selection can fulfil a patient's high expectations. Diagnostic wax-up provides an opportunity to experience a physical model of proposed size and outcome of final restoration. Upon patient's approval, reduction guides has been fabricated to provide information for controlled-tooth reduction. Having controlled tooth reduction can provide the optimal space for final restorations fabricated by dental technician, milling manufacture or conventional handcrafted¹¹. Follow up was done after 3, 6 and 9 month. Phonetics, occlusion, excursion movements and protrusion were re-evaluated. Prosthesis serves its function with out any failure or damage. With proper case selection and treatment planning clinician can easily fulfil the patient's expectation with minimal number of dental visits and at low cost.

Conclusion :

Careful patient selection is utmost important for veneer preparation. Ceramic laminate veneers are considered to be conservative and esthetic alternative for anterior teeth, this veneer retained FPD serves its function which is similar to conventional

FPD. Conservative tooth preparation and appropriate adhesive systems also improve the longevity of the restoration.

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ENDODONTIC MANAGEMENT OF RADIX ENTOMOLARIS – ACASESERIES

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Anatomical variations ,endodontic treatment , mandibular molar, radix entomolaris ,radix paramolaris.

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INTRODUCTION :

A comprehensive knowledge of the root canal anatomy is a basic prerequisite for the successful outcome of the endodontic treatment. The mandibular first molar has two roots (mesial and distal) and three canals (mesiobuccal, mesiolingual & distal). These two mesial canals can have separate apical foramen or two canals fused to one apical foramen. But in some cases the mandibular first molar can have an additional third root. This additional root is known as radix paramolaris when located buccally and radix entomolaris when located lingually.

This case report will elaborate about radix entomolaris (RE) which was first mentioned in the literature by Carabelli (1844). Clinicians should be aware of this unusual root morphology in mandibular first molars which helps to avoid procedural errors or 'missed canal' during root canal treatment. Operators often fail to recognize its presence and leave it untreated, especially in teeth exhibiting anatomic irregularities or accessory or aberrant root canals.

Based on different methods of investigation, the prevalence of RE is found to be high among Taiwanese (Chinese) population ranging from 21.1% to 33.33%, with a bilateral incidence from 53.65% to 68.57% in them,¹ whereas in Indian population it has been found to be less than 5%.^{2,3}

In 1971, Skidmore and Bjorndal reported that 71% of mandibular molar have one distal root and 29% with two distal roots.⁴ When it has two distal roots it shows 63% Vertucci type 1 root canal configuration, 14% Vertucci type 2 root canal configuration and 12% with type 4 root canal configuration.⁵

ABSTRACT :

The successful outcome of endodontic treatment depends on the clinician's awareness and understanding of unusual root and root canal morphologies. In mandibular molar an additional root is present. This root when located lingually is called as radix entomolaris and when found buccally known as radix paramolaris. The importance of pre-operative radiograph and advanced armamentarium for assessing such anatomical variations will be discussed in this case series.

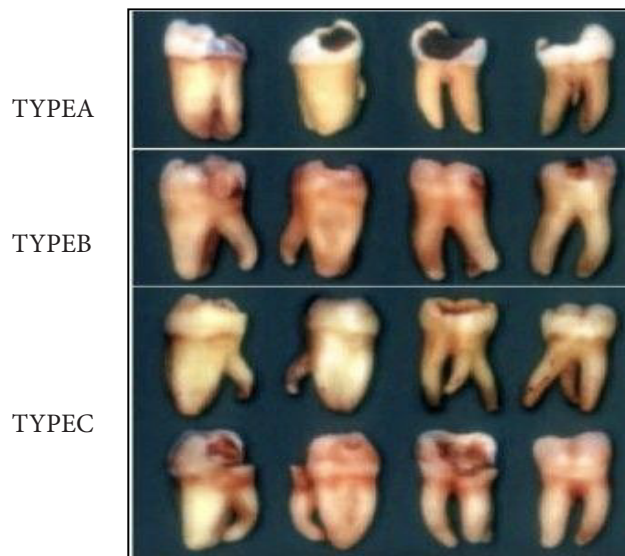
According to Carlsen and Alexandersen (1990) RE was classified into four different types based on the location of its cervical part:

- Type A: The RE is located lingually to the distal root complex which has two cone-shaped macrostructures
- Type B: The RE is located lingually to the distal root complex which has one cone-shaped macrostructure
- Type C: The RE is located lingually to the mesial root complex
- Type AC: The RE is located lingually between the mesial and distal root complexes.⁶⁻⁸



Ribeiro & Consolaro classified RE in 1997 based on the curvature of the root. There are 3 types of radix entomolaris according to its curvature:

- Type I: a straight root/root canal
- Type II: an initially curved entrance which continues as a straight root/root canal
- Type III: an initial curve in the coronal third of root canal and a second curve beginning in the middle and continuing to the apical third.⁶⁻⁸



Song et al. (2010) further added two more newly defined variants of RE :

1. Small type: Length shorter than half of the length of the distobuccal root
2. Conical type: Smaller than the small type and having no root canal within it.⁶⁻⁸

Another classification has been reported by Wan et al (2011) based on radiographic appearance of overlapped degree between distolingual (DL) and distobuccal (DB) root.

Type1 : Slight overlapped image

Type2 : Moderate overlapped image

Type3 : Severe overlapped image⁹



CASE REPORT 1

A 32-year-old female patient reported to the department of Conservative Dentistry and Endodontics in our institution with a chief complaint of pain in the lower left back teeth region, for the past 2 months. The patient had mild intermittent pain for the past two months and its intensity increased during the past ten days. The patient was sensitive to hot and cold beverages. The pain aggravated particularly at night.

On clinical examination, occlusal caries was detected on mandibular right first molar and the tooth was tender to vertical percussion. The pre-operative radiograph revealed radiolucency involving enamel, dentin, pulp with widening of periodontal ligament with respect to 46. Based on the clinical and radiographic finding, the tooth was diagnosed to have symptomatic irreversible pulpitis with apical periodontitis in 46. Root canal treatment was advised in 46. Informed consent was obtained and treatment was initiated.

CLINICAL MANAGEMENT:

The radiographic evaluation revealed 3 roots completely formed in 46.

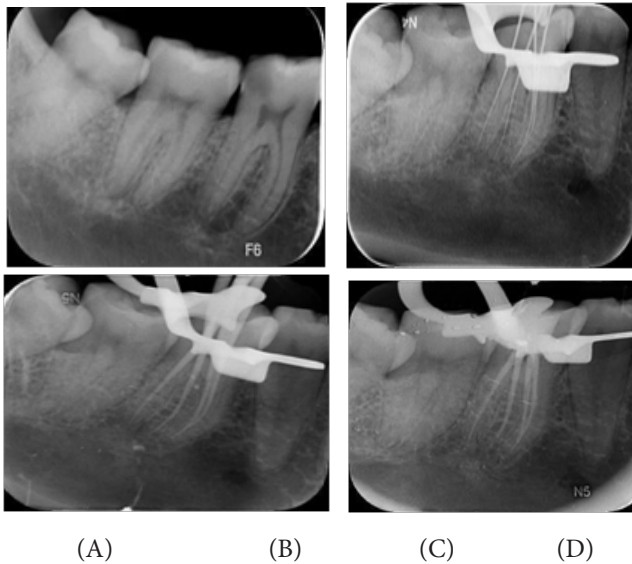
The tooth was anesthetized using 2% lignocaine with adrenaline. Access cavity preparation was done under rubber dam isolation. Four canals were located using DG-16 endodontic explorer i.e. mesiobuccal, mesiolingual, distobuccal and distolingual with trapezoidal cavity preparation. Magnifying loupes were used during the entire procedure. Canals were negotiated using ISO Size 8k and 10k file, followed by working length determination with 15k file using Dentsply Pixi Apex locator and verified using periapical radiograph.

The radiograph was taken with 30-degree mesial tilt horizontal angulation, which showed the additional root more clearly.

Cleaning and shaping was done using 6% ProTaper Gold rotary file (SX, S1, S2, F1) and was irrigated using 2ml of sodium hypochlorite (5.25%) at 60°C with double-side vented 27 gauge needle in 3ml syringe for 1 minute and 17% EDTA solution as a final rinse to remove the smear layer and finally flushed with sterile saline.

Mastercone X-ray was taken using F1GP at its working length and canals were dried using paper points. Obturation was done using F1 GP with zinc oxide eugenol sealer followed by post obturation composite restoration (A2 shade).

Post obturation radiograph was taken to establish the quality of the obturation.



Figure(A)Pre-operative radiograph of 46; Figure(B): working length determination of 46; Figure(C): mastercone xray of 46; Figure(D) post obturation restoration of 46

CASE REPORT 2 :

A 22 years old female patient reported to the department of Conservative Dentistry and Endodontics in our institution with a chief complaint of pain in the lower right back teeth region, for the past one month. The patient had mild intermittent pain for the past two months and its intensity has increased in the past five days. The patient was sensitive to hot and cold beverages. The pain aggravated particularly at night.

On clinical examination, fractured amalgam restoration was seen on the mandibular right first molar and was tender to vertical percussion. The preoperative radiograph revealed radio opaque tooth filling material and radiolucency involving enamel, dentin, pulp with widening of periodontal ligament with respect to 46. Based on the clinical and radiographic finding, the tooth was diagnosed to have symptomatic irreversible pulpitis with symptomatic apical periodontitis in 46. Root canal treatment was advised in 46. Informed consent was obtained and treatment was initiated.

CLINICAL MANAGEMENT :

The radiographic evaluation revealed 3 roots completely formed in 46.

The tooth was anesthetized using 2% lignocaine with adrenaline. Access cavity preparation was done under rubber dam isolation. Four canals were located using DG-16 endodontic explorer i.e. mesiobuccal, mesiolingual, distobuccal and distolingual with trapezoidal cavity preparation. Magnifying loupes were used during the entire procedure. Canals were negotiated using ISO Size 8k and 10k file, followed by working length determination with 15k file using Dentsply Apex

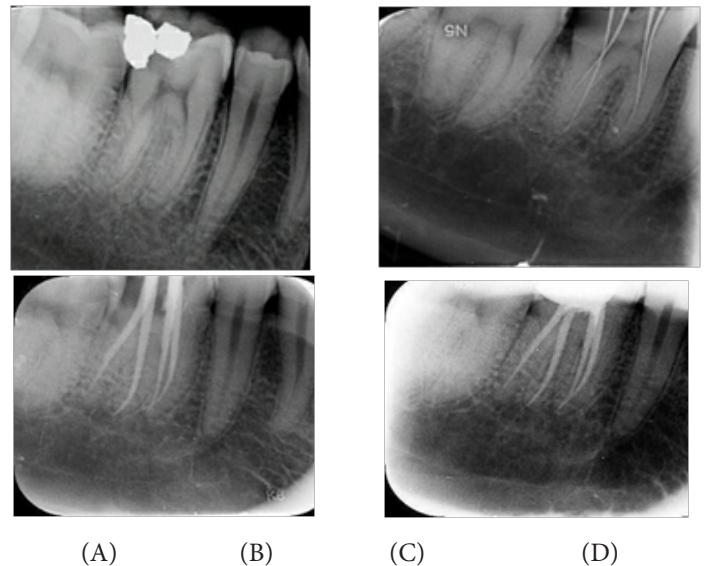
locator and verified using periapical radiograph.

The radiograph was taken with 30-degree mesial tilt horizontal angulation, which showed the additional root more clearly.

Cleaning and shaping was done using 6% ProTaper Gold rotary file (SX, S1, S2, F1) and was irrigated using 2ml of sodium hypochlorite (5.25%) at 60°C with double-side vented 27 gauge needle in 3ml syringe for 1 minute and 17% EDTA solution as a final rinse to remove the smear layer and finally flushed with sterile saline.

Mastercone X-ray was taken using F1 GP at its working length and canals were dried using paper points. Obturation was done using F1 GP with zinc oxide eugenol sealer followed by post obturation composite restoration (B2 shade).

Post obturation radiograph was taken to establish the quality of the obturation.



Figure(A)Pre-operative radiograph of 46; Figure(B): working length determination of 46; Figure(C): mastercone xray of 46; Figure(D) post obturation restoration of 46

DISCUSSION :

Radix entomolaris (RE) is generally seen in mandibular molars with predilection towards mandibular first molar.¹⁰

The occurrence of RE is not clearly known. RE can be related to external factors such as the penetration of an atavistic gene, a polygenetic system¹¹ or developmental disturbances during odontogenesis.

RE is mostly situated in the buccolingual plane to the distobuccal root. This position often leads to inaccurate diagnosis which may result in missed canals during endodontic procedures.

To overcome the challenges faced during the diagnosis and management of RE, the following methods should be

implemented.

An additional radiograph should be taken using SLOB/ buccal object view with an angulation of 30-degree mesially or distally.

The replacement of conventional radiograph to CBCT imparts excellence in working length determination, accessing the existing root canal filling and finding the exact root position.¹²

Furthermore, the usage of LED source on microscope provides high quality illumination when compared to traditional light source in locating the accessory canals.¹³

An adequate knowledge on laws of symmetry and orifices, dentinal maps aids in accurate diagnosis. Subsequently the usage of DG16explorer, microopener, toughing of the grooves with ultrasonic tips, staining the chamber floor with 1% methylene blue dye, champagne bubble test,¹⁴ supports in locating and managing RE. The usage of magnifying loupes also provides improved visualization. After appreciating RE from above techniques, the access cavity switches the outline from triangular to rectangular/ trapezoidal with extension to distobuccal region. Cleaning and shaping during the procedure becomes challenging depending upon the slender root curvatures. Hence irrigation is done with a double-sidevented 27gauge needle in 3ml syringe containing 2ml of (5.25%) sodium hypochlorite at 60 °C for 1 min and 17% EDTA solution as a final rinse to remove the smear layer. To achieve effective irrigation a device called Endovac which works by creating a negative pressure can be used.

This is followed by obturation along with suitable coronal restoration.

The limitations endured while managing the above cases of RE the improper positioning of radiograph and lack of CBCT and direct operating microscopes.

CONCLUSION :

An overall knowledge about the unusual root morphology, skills and experience of the clinician can pave way towards making confirmatory diagnosis and overcoming procedural endodontic errors.

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CONNECTIVE TISSUE GRAFT FOR ROOT COVERAGE

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Keywords :

Connective tissue graft, Root coverage

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Introduction :

Connective tissue is one of the most effective techniques for increasing the width of keratinized gingiva, root coverage, treating furcation, deficient alveolar ridges, managing per implant tissue abnormalities, and papillary loss. CTG was first defined by Alan Edel in 1974 for the purpose of improving gingiva width, and its uses in dentistry have grown substantially since then.

According to a Cochrane systematic review, the use of CTGs appears to be more adequate than others in cases where gain in keratinized tissue and root coverage is expected. This was also supported by Chambrone and Tatakis in their systematic review, who stated that subepithelialCTG, provided the best outcomes for clinical practice because of its greater percentages of mean and complete root coverage, as well as a significant increase in keratinized tissue. The following are some of the reasons why CTG is the gold standard: The periodontal plexus and the overlaying flap both provide bilaminar vascular supply. Furthermore, because of its regional specialisation, connective tissue supplies morphogenetic stimuli that favor histodifferentiation.

Why palate is common site :

Edentulous ridges, maxillary tuberosity, and palate can all be used to make connective tissue grafts, with the palate being the most common. Because of the great dimensions of grafts that can be obtained and the histological similarity between the palatal mucosa and the keratinized connected mucosa of the alveolar ridge, the palate is the most common site.

Techniques Include:

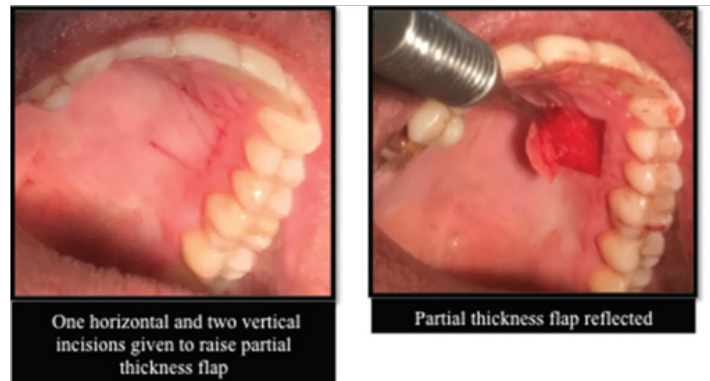
1.Edel's Method (1974)- Two Methods

A number 15 Swann Morton blade was used to make one horizontal and two vertical incisions and raise a partial thickness trapezoidal flap in Edel's initial palatal procedure. Then, using a horizontal incision, a secondary connective tissue flap was reflected and dissected at its base. Interrupted sutures were used to reposition the main flap. A full-thickness flap was mirrored in

Abstract :

Connective tissue graft (CTG) is the gold standard for soft-tissue correction and root coverage. The techniques to harvest CTG have undergone many modifications over a last few years since the time it was introduced by Edel in 1974 to increase the width of keratinized gingiva. This review compiles all the techniques of graft harvest from the palate and their modifications which have been introduced in the last few years. This analysis is based on systematic reviews, comparative human studies, and case reports that describe any novel graft harvesting technique.

the second palatal procedure, and a second incision was made internally to acquire a graft from the reflected flap. After that, the palatal flap was replaced and sutured. If necessary, a periodontal dressing is used.⁽¹⁾



2.Bomme And Taggart (1976):

First Technique :

A technique similar to Edel's first approach was utilised, but with the flap's base at the distal portion of the palate and a Brasher-Rees knife used to reflect and incise the connective tissue.

SECOND TECHNIQUE :

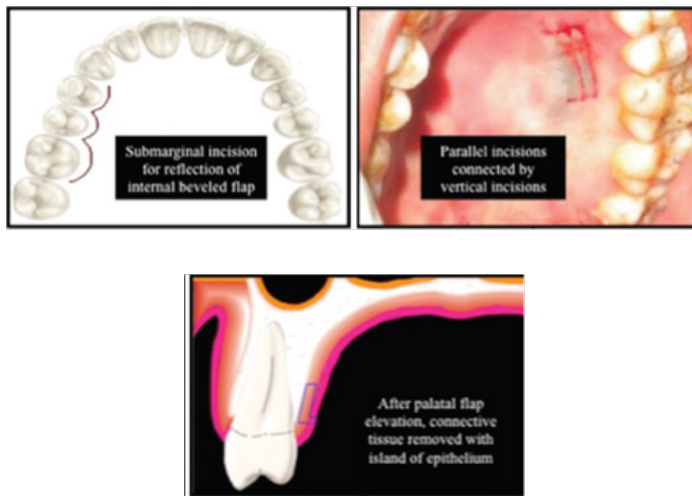
The principal horizontally displaced flap was reflected in

the same way as Edel's technique, but CTG was obtained using the Brasher-Rees knife. The palatal flap was sutured back in place with no dressing.

3. Langer & Calagna(1980-1982):

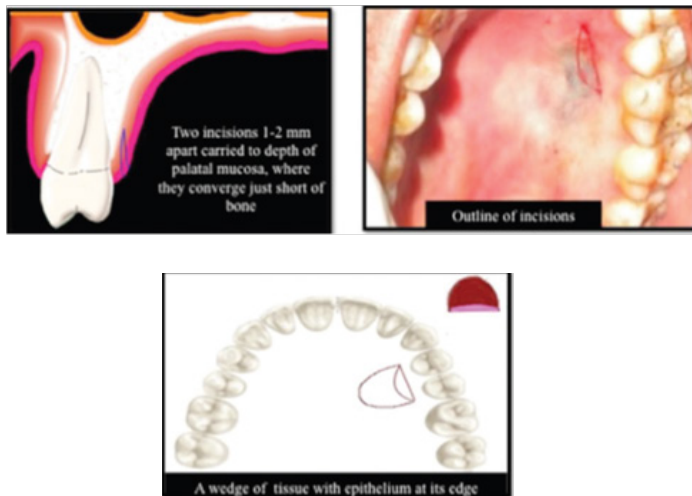
The technique was developed by Langer and Calagna in 1980-1982 based on the presence or absence of a periodontal pocket. An internally bevelled flap was elevated if a periodontal pocket was present. The donor material was a collar of connective tissue that formed the pocket wall and remained on the bone after reflection of the internally bevelled flap.⁽²⁾

If there was no periodontal pocket, two vertical incisions and two horizontal parallel incisions were made. The first horizontal incision is 4–5 mm apical to the palatal gingival edge, leaving a layer of connective tissue on the bone, and the second horizontal incision is 1–2 mm coronal to the first incision. The bone's connective tissue (with epithelial collar) was removed, and the donor site was sutured.⁽³⁾



4. RAETZKE (1985) :

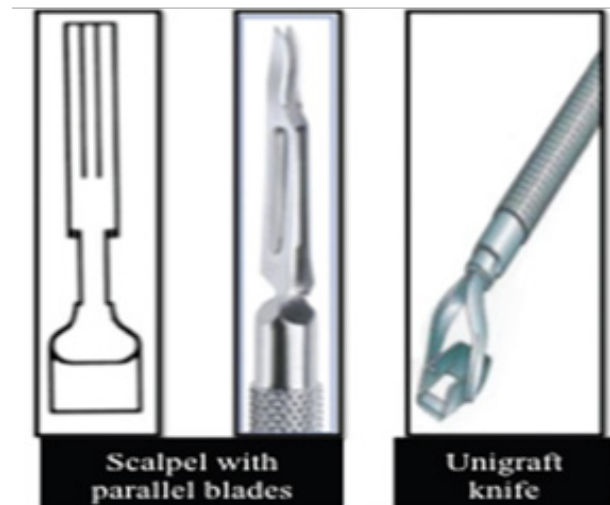
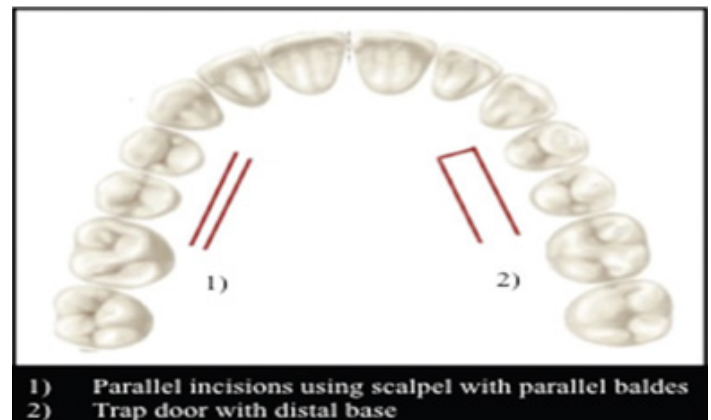
An envelope flap was formed 1–2 mm apical to the first incision, parallel to the long axis of the teeth, and carried medially depending on the height of graft necessary.^{(4) (5)}



5. Harris Technique (1992) :

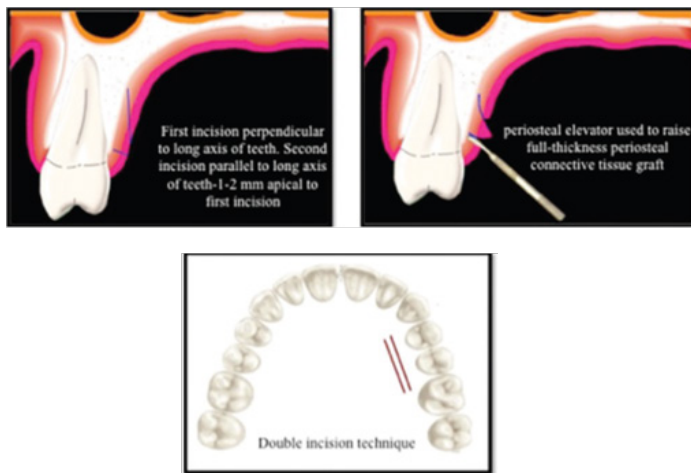
He employed two methods. Two parallel horizontal incisions were made using a scalpel with 1.5 mm-apart parallel blades (H and H Company, Ontario, CA, USA). These incisions were made 10–12 mm into the palate on the medial side. Then, between the parallel incisions, the mesial, distal, and medial edges were incised to create a homogeneous, thick CTG with an epithelial boundary.

A Unigraft knife from Ace Surgical Supplies (ACE Surgical Supply Co., Inc., Brockton, MA) was utilised to create consistent 1.5 mm thick CTG in the second approach. This knife may be disassembled and rebuilt to be used in both pushing and pulling directions.⁽⁶⁾



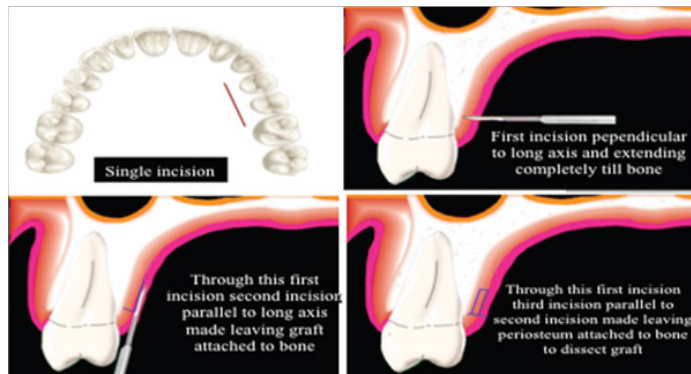
6. BRUNO'S TECHNIQUE (1994) :

States that the initial incision should be made at 90 degrees to the long axis of the teeth until the bone is reached, with the length of the incision equivalent to the desired transplant. A second incision was made 1–2 mm apical to the first, parallel to the long axis of the teeth, and carried medially depending on graft height. Depending on the desired graft size, one horizontal incision was made perpendicular to the bone around 2–3 mm apical to the gingival margin on the palate using a number 15 blade. A split-thickness flap was then elevated by incising parallel to the long axis of the teeth through this incision.



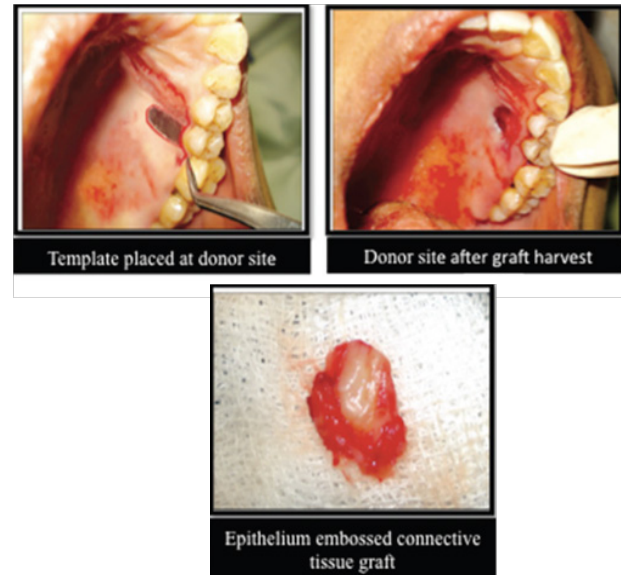
7. DEL PIZZO ET AL. 2002 :

A deep, sharp dissection via first incision, but parallel to the second incision, was made to detach the graft from the underlying bone after reflecting a split-thickness flap, when the connective tissue was adherent to the bone. The periosteum was not removed with the connective tissue since it aids in the creation of granulation tissue and speeds wound healing.⁽⁷⁾



8. "Epithelial Embossed Ctg" For Root Coverage, Ramakrishna Et AL., 2011.

On the donor site, a template of the desired graft size was implanted. On either side of the template, an incision was created that extended 3 mm near to the gingival margin. The epithelium was then undermined 3 mm on all sides from the incision made around the template. To separate the connective tissue of the surrounding 3 mm, a releasing incision was made. The graft was then harvested, containing connective tissue on all sides and a core region embossed with epithelium that perfectly fitted the defect.⁽⁸⁾



CONCLUSION :

Connective tissue remains the most reliable and gold-standard procedure for various soft tissue augmentation treatments, particularly for the treatment of gingival recession, due to its unique character. With the incredible success rates of CTG in the treatment of gingival recession, its application in periodontal aesthetic treatments has skyrocketed. With the rise in its utilization, several strategies have been presented over the last 44 years to make the CTG harvesting procedure easier, less traumatic, and more predictable.

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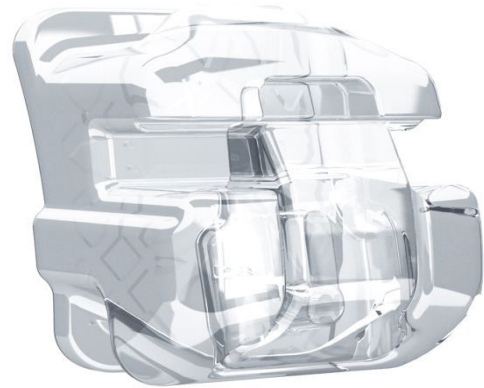
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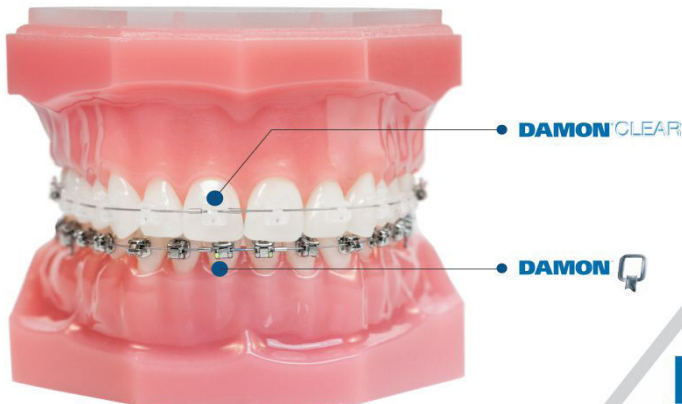
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