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RESEARCH ARTICLE

RADIOGRAPHIC FOLLOW-UP OF A PERIAPICAL CYST ASSOCIATED WITH PULPECTOMIZED PRIMARY MOLAR MANAGED WITH MARSUPIALIZATION: EMPHASIS ON CYSTIC HEALING AND ERUPTION OF THE PERMANENT TOOTH IN THE CYSTIC REGION- A CASE REPORT.

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Abstract

Periapical radiolucencies related to primary teeth are often overlooked, and in many instances, they resolve after the extraction of the affected tooth. Grundy, Adkins, and Savage have reported a series of radicular cysts associated with endodontically treated deciduous teeth containing formocresol, a compound that, when combined with tissue proteins, becomes antigenic.[12] This combination is known to elicit both humoral and cell-mediated immune responses. The current case discusses a radicular cyst associated with a primary molar that underwent endodontic treatment.

Introduction:-

The World Health Organization (WHO) defines a radicular cyst as an inflammatory odontogenic cyst linked to the root of a nonvital tooth. It is the most prevalent type of jaw cyst, representing 60% of all cysts in this region. However, its association with primary teeth is rare, around 0.5–3.3%, as pulpal and periapical infection in deciduous teeth tend to drain more rapidly than permanent teeth.[3]

Researchers have identified an association between carious and endodontically treated primary teeth and the development of cystic lesions, most commonly presenting as radicular
cysts of deciduous teeth or as inflammatory dentigerous cysts involving the corresponding succedaneous teeth. (Manekar VS et al)[4]
In the primary dentition, the mandibular molars (67%) are commonly affected, followed by maxillary molars (17%), and approximately 30% are associated with previous endodontically treated teeth(Jayanta Saikia et al. 2020).[5]Radicular cysts associated withprimary teeth can lead to various complications, including bone expansion

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and resorption, delayed eruption of teeth, misalignment, enamel defects, and damage to the developing permanent teeth. [6]

Treatment options typically include either enucleation or marsupialization, both of which should be accompanied by the extraction of the affected primary tooth (Bodner, 2002)[7]

Preserving the permanent teeth is one of the most appropriate treatment choices for these cases. As the alignment of the permanent tooth, even if unfavourable initially, is seen to improve spontaneously over time.[7]

This article provides a compelling case report of a radicular cyst associated with an endodontically treated mandibular second primary molar. It highlights our successful treatment using marsupialization and includes a three-year clinical and 2 years radiographic follow-up of the patient to monitor the healing process and the eruption of the permanent tooth associated with the cyst.

Case presentation

A 9-year-old male patient presented with a primary complaint of swelling in the left lower cheek region, which had been present for the past two months. Initially small and asymptomatic, the swelling had gradually increased to its current size. The patient also reported episodes of dull pain in the affected area over the pastweek.

Extra-orally, a solitary diffuse swelling was observed on the left lower third of the face. The swelling, with no marked discolouration of the skin, measured approximately 2 cm × 3 cm and wasfirm in consistency and exhibited mild tenderness upon palpation. The left submandibular lymph nodes were both tender and palpable. (Fig. 1)Intraoral examination revealed obliteration of the left buccal vestibule and expansion of the buccal cortical plate concerning the second primary molar, permanent canine, first premolar, and permanent first molar in the mandibular left quadrant.

The primary second molar was restored with a glass ionomer cement, and grade 1 mobility was detected for the primary second molar, permanent first premolar, and first molar in the same quadrant (Fig. 2A &B). Radiographic examination via panoramic radiograph revealed a well-defined radiolucent lesion with corticated margins, measuring approximately 3cm × 3cm, in close association with the left mandibular second primary molar. Furthermore, the primary second molar demonstrated evidence of previous endodontic intervention (pulpectomy), and the left mandibular second premolar exhibited a horizontally positioned orientation, concomitant loss of follicular space surrounding the developing second permanent premolar in the same quadrant.

The CBCT imaging corroborated the findings from the panoramic radiograph and revealed that the permanent second premolar is positioned horizontally in the buccolingual direction, with the inferior alveolar nerve situated very close to the lesion (Fig. 4). Straw-colored fluid was obtained on the Fine needle aspiration. (Fig.6A).Given the proximity of the lesion to the inferior alveolar nerve, marsupialization of the lesion was performed following the extraction of the left mandibular second primary molar(Fig.5A). For the first three days, a combination of Soframycin and a metrogyl pack was applied. Followed by an iodoform pack was placed for the next five days(Fig. 5 B)

The extracted teeth and associated soft tissue at the periapical region and the aspirated fluid (Fig. 6 A, B & C)were sent for histopathological examination. The final diagnosis of the lesion was a radicular cyst associated with a Pulpectomizedleft lower second primary molar (Fig. 7). A removable non-functional space maintainer with an acrylic plug was inserted after one week. (Fig.8A)

The patient was on regular follow-up,starting with the first check-up on the 3rd day, followed by another on the 5th day, and then biweekly follow-ups for the next 8 weeks. Clinically significant healing of the site of marsupialization was achieved within 8 weeks(Fig. 8 B).

Further follow-up appointments were strategically scheduled at 3 months, 6 months, and 1 year, continuing with biannual check-ups for an additional 2 years. Panoramic radiographs were taken at 8 weeks and then at 6-month intervals throughout the first year (see Fig.9A, B, and C). A fourth follow-up radiograph was taken two years after the initial intervention (see Fig.9D). The panoramic x-ray taken at the 12-month follow-up revealed complete healing of the lesion and improvement in the position of the permanent premolar(Fig.9C).

So, these thorough assessments revealed that the permanent premolar successfully erupted into optimal occlusion, demonstrating impressive spontaneous correction of angulation of the concerned permanent tooth without the need for any orthodontic intervention (Fig.8D &E). This outcome highlights the remarkable ability of the human body to self-correct when the physical obstructions to eruption are eliminated.

Discussion:

Radicular cysts are odontogenic cysts associated with inflammatory conditions that result from non-vital or endodontically treated teeth. It is relatively rare to encounter radicular cysts associated with primary teeth, “Lustman et al. reported 28 cases in the literature from 1898 to 1985. In a systematic review from 1927 to 2004, Nagata et al. summarized 112 cases of radicular cysts originating from primary dentition.”[8]

The rare occurrence of cystic lesions in primary teeth may stem from the shorter duration of deciduous dentition compared to permanent teeth. Accessory canals promote drainage, reducing cystic pressure and often resulting in no symptoms. Additionally, primary teeth have a greater number of immune-responsive cells in their pulp, which influences the biological response and growth of radicular cysts. Moreover,radiolucent lesions around the apical area of deciduous teeth can also be misdiagnosed, overlooked, or absorbed after extraction/exfoliation.(Eliyahu et al., Rodd H D et al).[9]

Dental caries and trauma are the two most common etiologies for the occurrence of radicular cyst in primary dentition, resulting in periapical inflammation and necrosis,which triggers the proliferation of epithelial cells of Malassez surrounding the apex of the roots.[9]

The radicular cyst associated with endodontically treated teeth can be due to the irritation caused by the intracanal medicaments and root canal sealants used during the procedure.[9]

Takiguchi et al.(2001) reported a correlation between the intracanal dressing materials used for pulp treatment and the distinctive intraepithelial particles found in the cyst wall. Shetty et al. presented an update on 11 cases of radicular cysts involving primary teeth; half of these cases were linked to Pulpectomized teeth, while the other half were caused by caries or trauma. Additionally, Grundy et al. described 17 cases of odontogenic cysts associated with primary molars that underwent pulp therapy.[9]

Even though the present case was also associated with a pulpally treated primary second molar, no evidence of root canal-treated material could be detected in the specimen.

The frequent occurrence of radicular cysts in association with endodontically treated primary teeth raises significant concerns for clinicians, necessitating careful monitoring of the initial proteolytic changes that take place periapically. This vigilance is required to prevent the development of large lesions(Schwendicke et al., 2021).[10]

When associated with primary teeth, early detection is vital, as permanent tooth germs may become displaced due to the enlarged lesions, and this may necessitate orthodontic intervention following the removal of lesions and tooth extractions. The placement of space maintainers is frequently required to prevent the migration of adjacent teeth while awaiting the eruption of the permanent teeth [Wagner et al., 1999; Yao et al., 2015].[7]

Yawaka et al. [2002] reported a case involving a periapical cyst linked to a mandibular primary molar in a 13-year-old patient. The treatment involved the extraction of the primary molar followed by marsupialization. Following the surgery, traction was applied for two years to successfully reposition the impacted permanent premolar.[7]

Lenzi & Medeiros [2006] observed a spontaneous eruption of eleven permanent maxillary incisor teeth after 2 years, following marsupialization of a radicular cyst associated with primary incisors in a 5-year-old patient.[11]

Tanaka et al. (2019) reported the achievement of optimal occlusion through orthodontic treatment after marsupialization of a large periapical cyst associated with a decayed maxillary primary molar.[12]

The surgical approach is the preferred treatment option, utilizing either marsupialization or enucleation. R. Izettiet al.(2024) conducted a systematic review comparing these two strategies for managing radicular cysts associated with primary teeth. Their findings indicate that both techniques were effective in treating these lesions, as none of the studies included in the review reported recurrence, suggesting an overall positive prognosis.[7]

Choosing between enucleation and marsupialization for large cysts depends on factors like cyst size, location, and proximity to vital structures.In the present case,the lesion was in proximity to the inferior alveolar nerve. So, we decided to proceed with marsupialisation in this case.

Conclusion

Early diagnosis and timely treatment of infections in the oral and maxillofacial region, utilizing current protocols in primary healthcare, can help to avoid the need for invasive procedures and reduce the risk of further complications in the jawbone or craniofacial region.

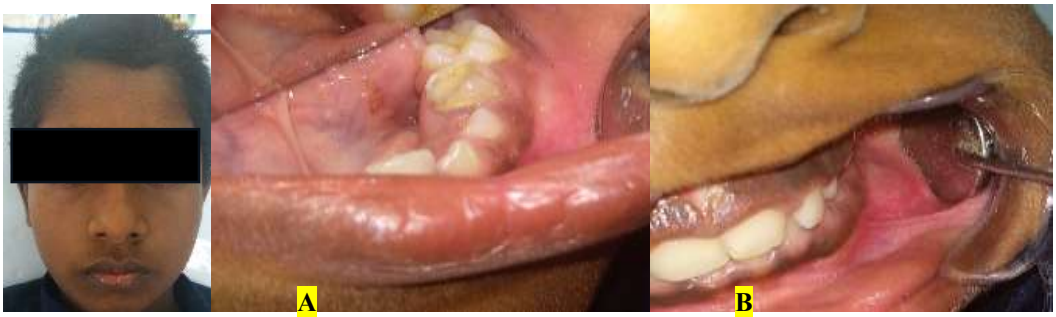


Fig 1- Diffuse swelling of leftlower 1/3rd of face

Fig 2- A:Erupting 33 and 34, GIC restoration in relation to 75,B:Vestibular obliteration with buccal cortical plate expansion in relation to 75 and 36

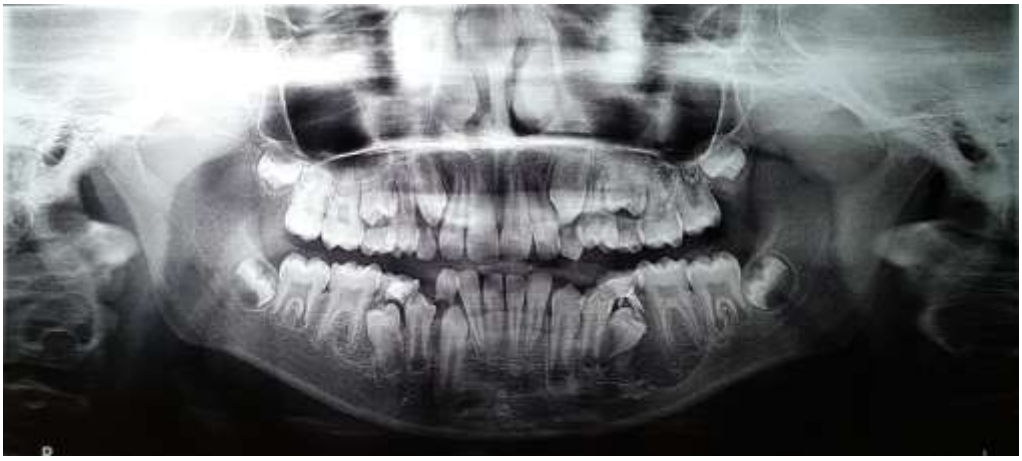


Fig 3- Well defined radiolucency with corticated margins measuring about 3 × 3 cm approximately in relation to 75 36 with horizontally placed 35, Pulpectomy treated 75, loss of follicular space in relation to 35

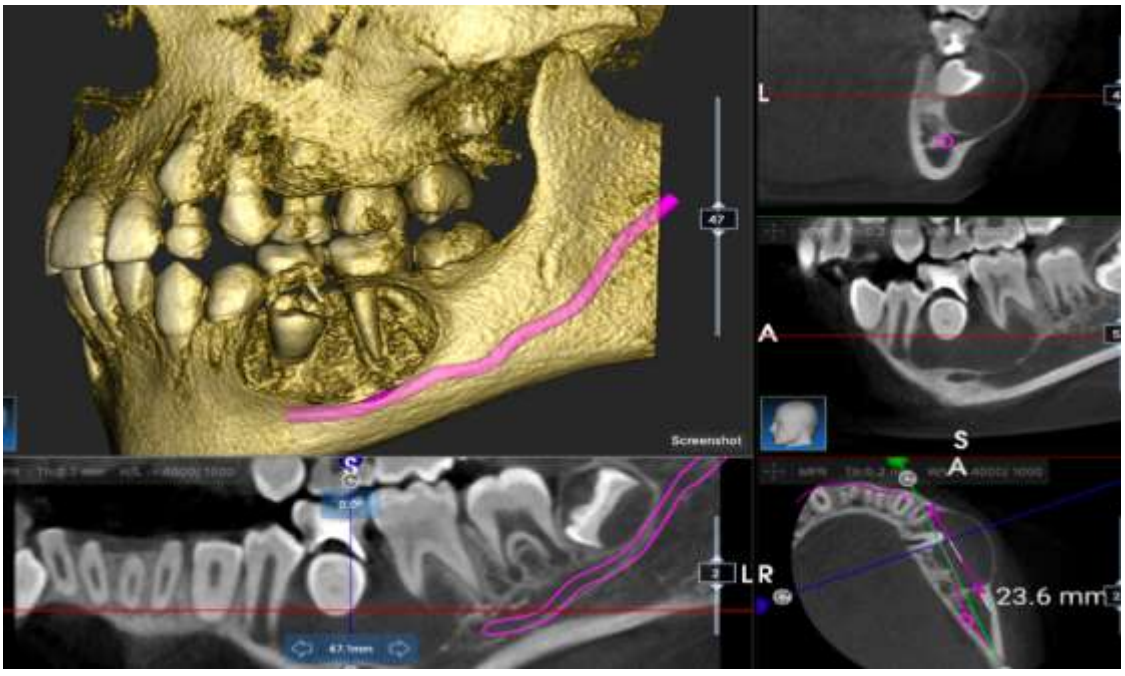


Fig 4-Tooth 35 placed horizontally in a buccolingual direction, the inferior alveolar nerve runs close relation with the cyst

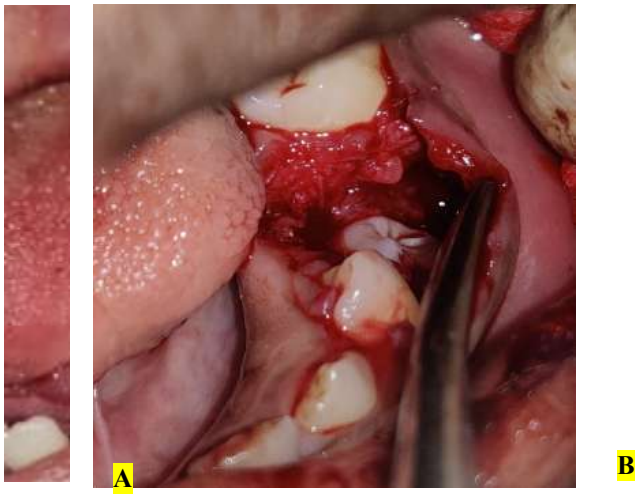


Fig 5- A: After extraction of the tooth75,B:Soframycin and Metrogyl pack for 3 days followed by iodoform pack for 5 days

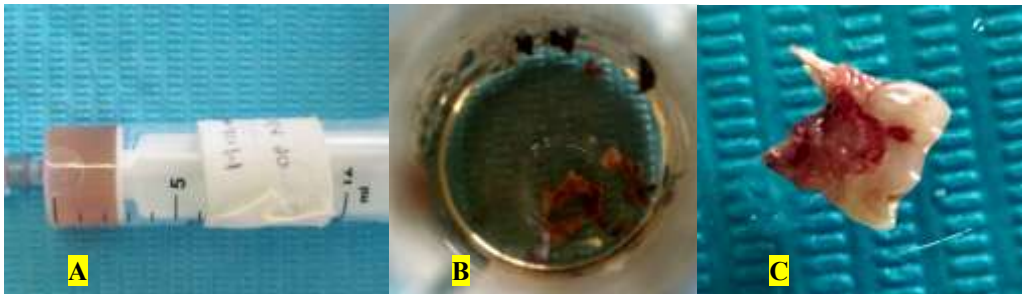
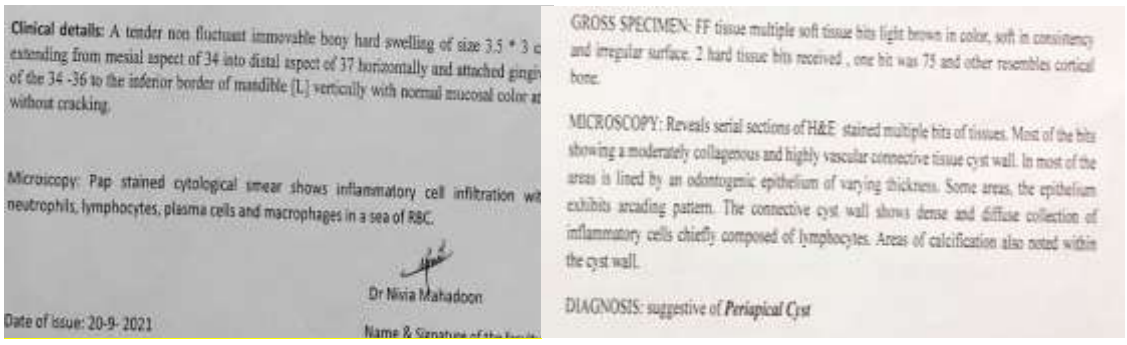


Fig 6- A:Straw colored fluid on aspiration, B &C:Excised lesion



Clinical details: A tender non fluctuant immovable bony hard swelling of size 3.5 * 3 c extending from mesial aspect of 34 into distal aspect of 37 horizontally and attached gingi of the 34 -36 to the inferior border of mandible [L] vertically with normal mucosal color a without cracking.

Microscopy: Pap stained cytological smear shows inflammatory cell infiltration wi neutrophils, lymphocytes, plasma cells and macrophages in a sea of RBC.

Dr Nivia Mahadoon

Date of issue: 20-9- 2021

Name & Signature of the

GROSS SPECIMEN: FF tissue multiple soft tissue bits light brown in color, soft in consistency and irregular surface. 2 hard tissue bits received , one bit was 75 and other resembles cortical bone.

MICROSCOPY: Reveals serial sections of H&E stained multiple bits of tissues. Most of the bits showing a moderately collagenous and highly vascular connective tissue cyst wall. In most of the areas is lined by an odontogenic epithelium of varying thickness. Some areas, the epithelium exhibits arcading pattern. The connective cyst wall shows dense and diffuse collection of inflammatory cells chiefly composed of lymphocytes. Areas of calcification also noted within the cyst wall.

DIAGNOSIS: suggestive of *Periapical Cyst*

Fig 7- FNAC and Biopsy report

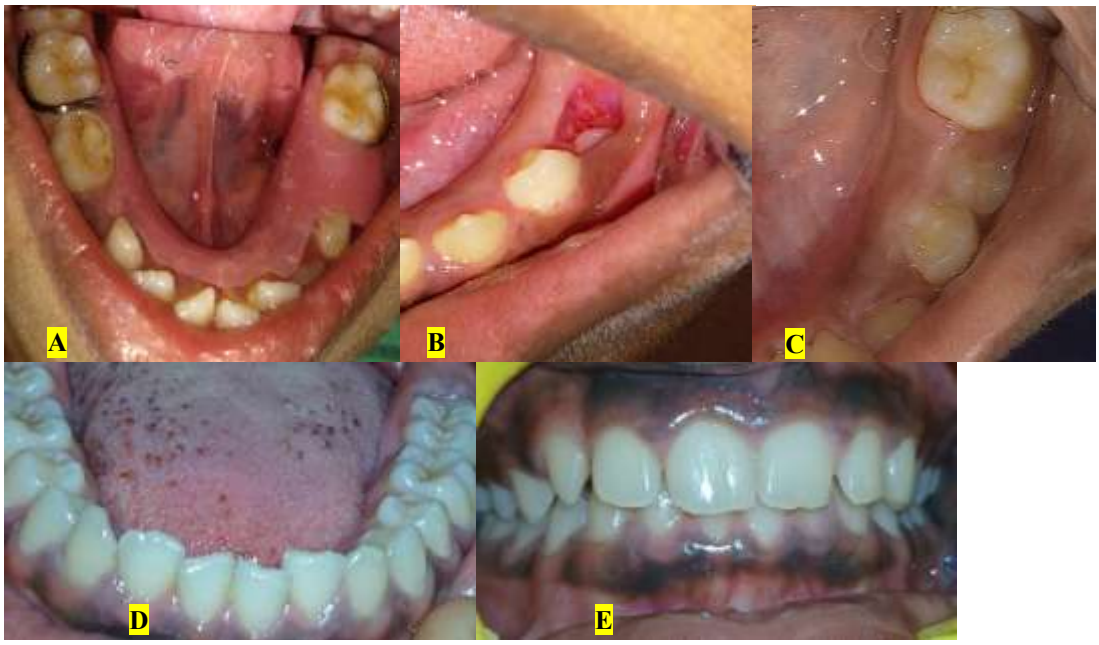
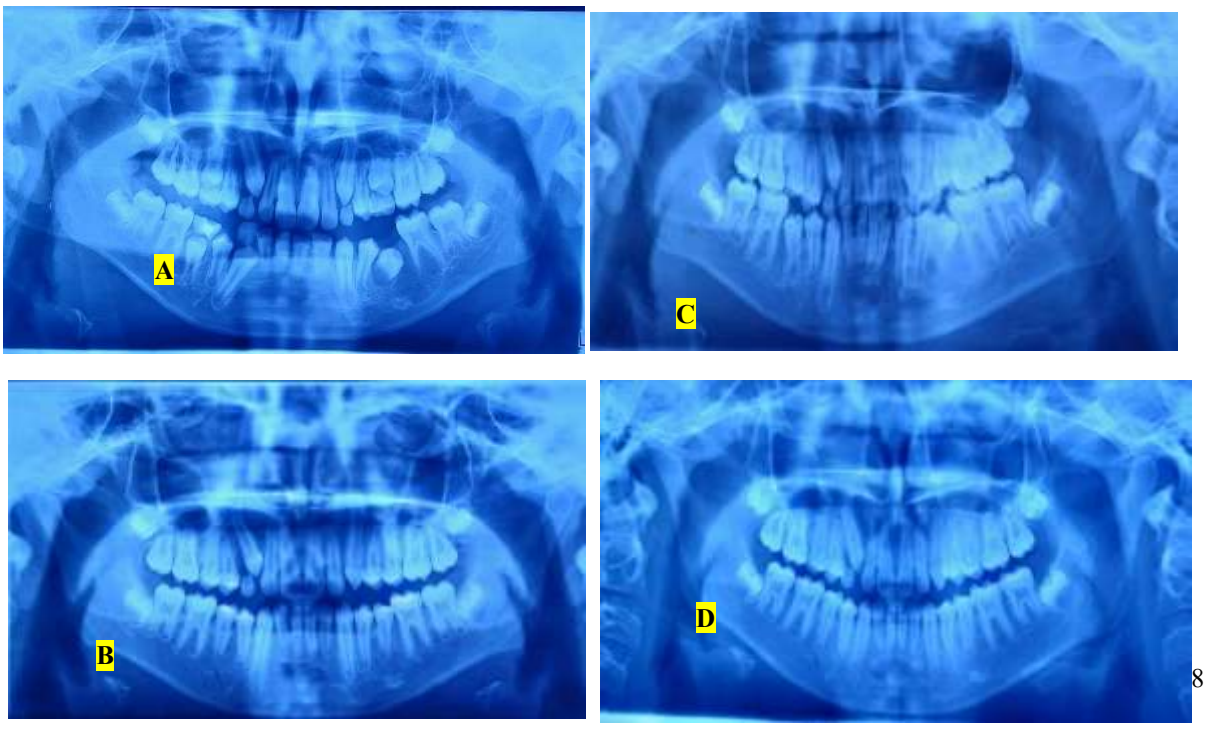


Fig 8-A:Nonfunctional RPD with acrylic plug in relation to 35 inserted after 1 week, B: Follow up after 8 weeks, C: Follow-up after 6 months, 35 erupting in to oral cavity as buccally to 34 and 36, D:Follow-up after 3 years,35 eruptedcompletely in to the occlusion, E:Intra-oral front view at 3 yearsfollow up.



C

Fig 9 Radiographic follow up-A: after 8 weeks Lesion reducing in size, B: Follow up after 6 months 35 erupting buccally with continued trabeculae formation in cystic area, C: Follow-up after 1 years, continued bone formation in cystic region and continued eruption of 35 with progressing root formation, D: Follow up at 2 years: Complete healing of cystic site with roots of 35 at Nolla's 8th stage

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