

An Assessment of Changes in Developing Succedaneous Teeth as A Result of Infected Deciduous Teeth

Dr. Riyaz Ahmed¹, Dr. Soundarya Singh², Dr. Asib Ahmad³, Dr Nimish Tyagi⁴, Dr Chitrapriya Saxena⁵,
Dr Himanshu Tomar⁶

¹Head of the Department & Associated Professor LLRM Medical College& hospital, Meerut, India

²Lecturer LLRM Medical College& hospital, Meerut, India

³Senior resident LLRM Medical College& hospital, Meerut, India

⁴Senior resident LLRM Medical College& hospital, Meerut, India

⁵Senior resident LLRM Medical College& hospital, Meerut, India

⁶Senior lecture Kalka Dental College and Hospital, Meerut, India

Abstract: *Pulpal infection of primary teeth and subsequent periapical infection may lead to developmental defect in permanent teeth. Therefore the main aim of this study was to assess the changes in developing succedaneous teeth as a result of infected deciduous teeth of patient age group of 4-10 years. These patients were selected from the Outpatient Department of Dentistry, LLRM Medical College, Meerut. The intraoral periapical X-rays were used to interpret effects of infected deciduous teeth on their developing succedaneous teeth. The values obtained was tabulated and subjected to statistical analysis. It was concluded that in patients with Infected primary teeth the developing succedaneous teeth exhibits premature eruption ,torsion , Crater like bone loss , Bony sequestration and Crown dilacerations amongst one hundred and twenty subjects.*

Keywords: Premature eruption , torsion , crater like bone loss , bony sequestration and crown dilacerations

1. Introduction

The need for dental treatment in pediatric dental patient is immense. Parents usually seek the services of a Pedodontist for the first time when a child suffers from discomfort, pain, swelling or traumatic injuries of oral cavity. The present study was carried out in the children of age group of four to ten years with recurrent episodes of dentoalveolar infection.

In present study we studied the effect of infected deciduous teeth on their developing permanent successors by radiographic evidence. Pulpal infection of primary teeth and subsequent periapical infection may lead to developmental defect in permanent teeth. This had been demonstrated clinically, radiographically, histologically and experimentally by several investigators.¹

Early detection and diagnosis of dental anomalies are important steps in evaluation of child patient and treatment planning, the procedures required clinical examination and investigation to investigate young population using radiographs in order to verify the findings of dental anomalies in this population and compare them to findings elsewhere.

Studies also demonstrates radiographic rarefaction of bone in the periapical area. One would expect more rapid eruption of

permanent teeth when overlying bone is destroyed by infection and some occlusal defect (torison), dilacerations of crown, excessive osteolysis.²

The infection of periapical area of primary tooth can be causative agent of an enamel defect in an unerupted permanent tooth. When the loss of primary tooth has been accompanied by osteolysis or other alveolar bone losses, the succedaneous permanent tooth may erupt early, but dental development of roots remains normal stage.³

Aims

Aims of present study were that to assess the changes in developing succedaneous teeth as a result of infected deciduous teeth of patient age group of 4-10 years.

2. Materials and Methods

The present study was carried out in pediatric patients of age group of 4-10 years those had infected primary teeth. These patients were selected from the Outpatient Department of Dentistry, LLRM Medical College, Meerut. In the present study the changes were observed in the developing permanent teeth as a consequence of inflammation or infection of the preceding primary teeth and intraoral periapical X-rays were

used to interpret effects of infected deciduous teeth on their developing succedaneous teeth.

120 intraoral periapical radiographs of children having infected primary teeth and periapical bone destruction of 82 male and 38 females of age group 4-10 years, 20 Intraoral periapical radiograph of control teeth of same patient on contralateral non-infected primary teeth and 20 Intraoral periapical X-rays of non-infected primary teeth as control teeth of other patients of same age group were selected. Radiographs were made following complete medical and dental histories and a thorough clinical examination.

The selected patients were required to fulfill following criteria:

- 1) Patients were selected irrespective of sex, religion, caste and socioeconomic status.
- 2) Patients with clinically and radiologically diagnosed carious and infected, non-vital/ vital primary teeth either in maxillary or in mandibular arch were included in the study.
- 3) Following clinical signs and symptoms were recorded:
 - Presence or absence of gingival swelling.
 - Presence or absence of sinus tract.
 - Presence or absence of spontaneous pain.
 - Presence or absence of pain on percussion
- 4) The following radiological findings were recorded:
 - Presence or absence of bifurcation radiolucency
 - Presence or absence of periapical radiolucency
 - Presence or absence of internal root resorption
 - Presence or absence of external root resorption.
 - Presence or absence of torsion of developing succeduous tooth.
 - Presence or absence of premature eruption of developing succedaneous tooth.
 - Presence or absence of craterlike bone loss.
 - Presence or absence of bony sequestration.

Distribution of cases

The whole study was divided into two groups:

Group I: 120 Intraoral periapical X-rays of those patients having infected primary teeth and 20 intraoral periapical X-ray of control teeth were selected from same child by utilizing contra lateral non-infected primary teeth. However, this was not always possible to do because of the bilateral presence of abscessed teeth in some subjects.

Group II: 20 intraoral peri apical X-rays of those patients who did not have infected primary teeth used as control teeth, these radiographs have been taken from healthy teeth of same aged patients.

Procedures

Patients were selected for this study from Outpatient Department of Dentistry, LLRM Medical College, Meerut. As per selection criteria used for the study, parents and patients: were informed about the procedure.

Medical and dental history of all the patients were recorded. Clinical signs and symptoms were noted. Intraoral periapical X-rays were taken, then the film was interpreted.

Following methods were approached to Interpret radiographs:

1. Viewing images under ideal conditions
2. Interpretation from quality radiographs only
3. Obtaining additional films as necessary .
4. Describing radiologic findings precisely
5. Explaining the significance of the findings
6. Developing a differential diagnosis
7. Stating diagnostic impression
8. Making recommendations as appropriate

1. Interpretation only from Quality radiographs

Only good quality radiographs were interpreted.

2. Describing the Radiologic Findings

The radiologic findings included the following information:

- 1) Location and size
- 2) Osteolytic versus osteoblastic
- 3) Characteristics of the margins
- 4) Characteristics of the lesional tissue
- 5) Relationship of lesion to teeth
- 6) Effect of lesion on teeth
- 7) Cortical changes induced by lesion;
- 8) Periosteal reaction to lesion
- 9) Explaining the Significance of Findings
- 10) Developing a Differential Diagnosis
- 11) Making Recommendations

Recommendations were made following radiologic finding

3. Observations

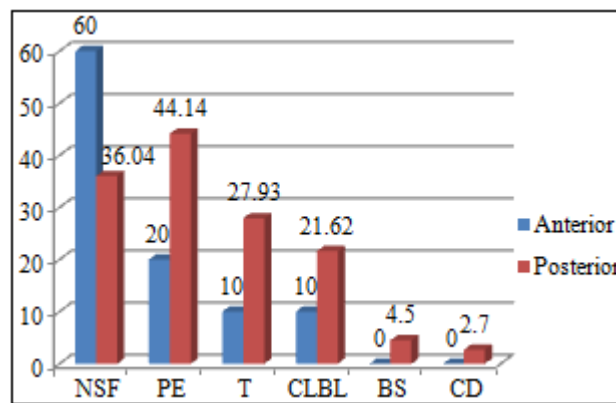


Figure 1: Comparison of Radiological Finding of Infected Primary Teeth (Experimental Group) With Control Group

NSF- No Significant Finding, PE- Premature eruption, T- Torsio, CLBL-Crater like bone loss, BS-Bone sequestration, CD- Crown dilacerations

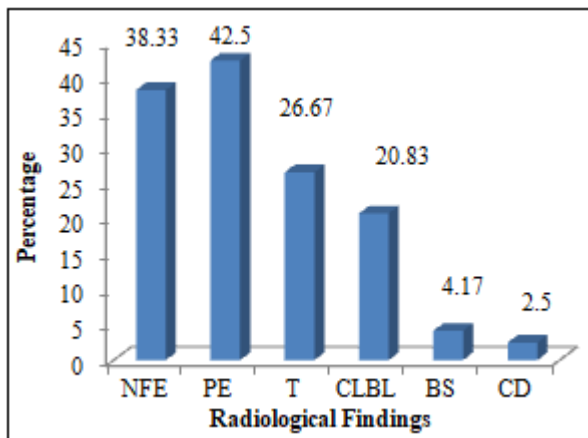


Figure 2: Comparison of Radiological Finding of Infected Primary Teeth

NSF- No Significant Finding, PE- Premature eruption, T- Torsio, CLBL-Crater like bone loss, BS-Bone sequestration, CD- Crown dilacerations

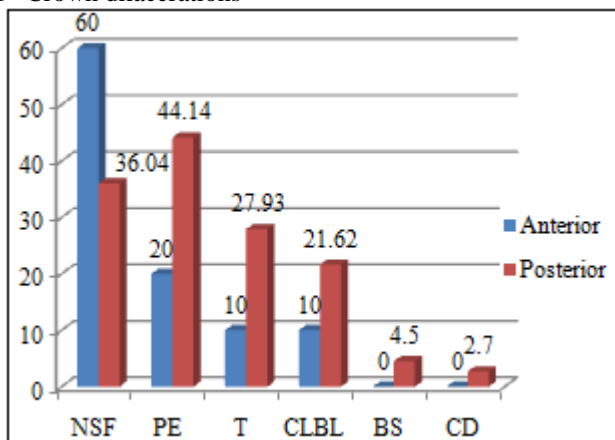


Figure 3: Comparison of Radiological Finding in Different Position of Teeth

NSF- No Significant Finding, PE- Premature eruption, T- Torsion, CLBL-Crater like bone loss, BS-Bone sequestration, CD- Crown dilacerations

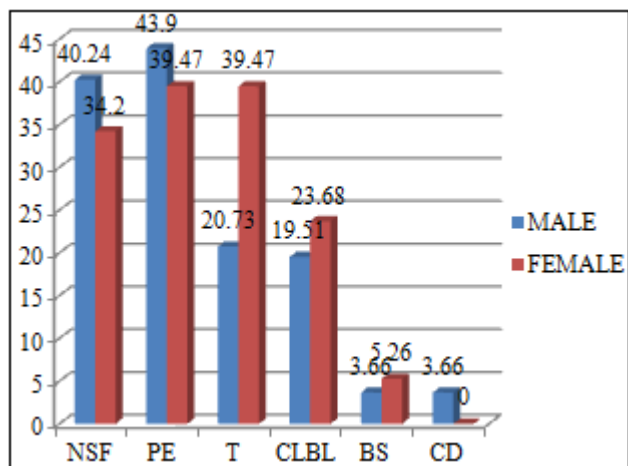


Figure 4: Comparison of Radiological Finding in Male and Female

NSF- No Significant Finding, PE- Premature eruption, T- Torsion, CLBL-Crater like bone loss, BS-Bone sequestration, CD- Crown dilacerations

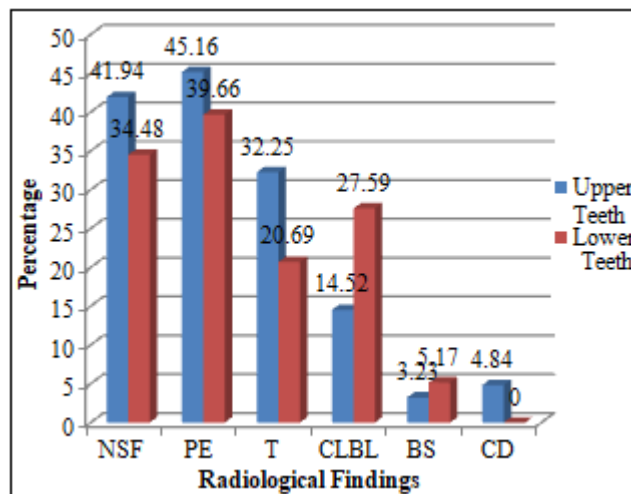


Figure 5: Comparison of Radiological Finding in Upper/Lower Teeth

NSF- No Significant Finding, PE- Premature eruption, T- Torsion, CLBL-Crater like bone loss, BS-Bone sequestration, CD- Crown dilacerations

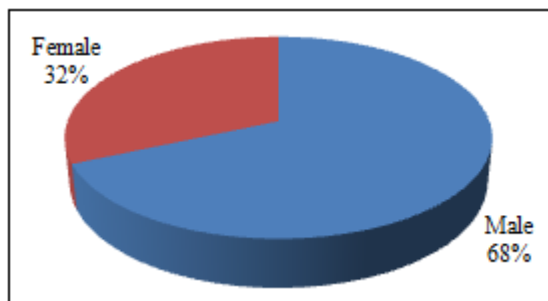


Figure 6: Comparison of Sex of Patients

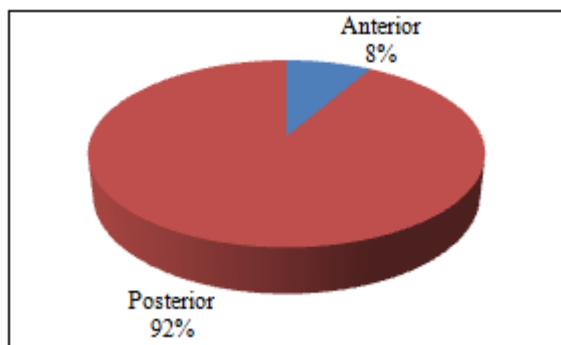


Figure 7: Comparison of Teeth Position in Patients

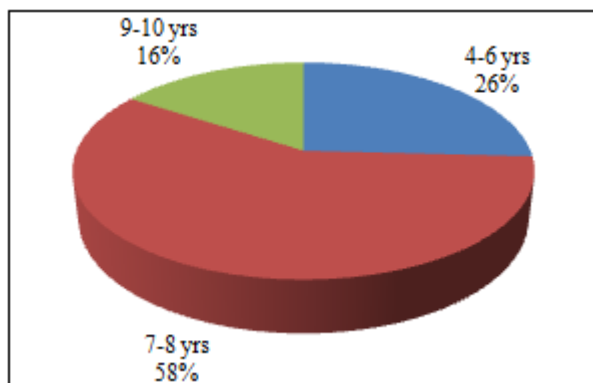


Figure 8: Comparison of Age of Patients

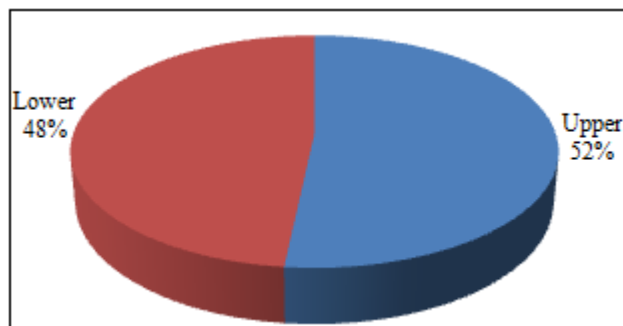


Figure 9: Comparison of Maxillary and Mandibular Teeth

4. Discussion

Early detection and diagnosis of dental anomalies are important steps in evaluation of child patient and treatment planning. In the present study we determined radiographic evidence of effect of infected deciduous teeth on their developing permanent successors. Pulpal infection of primary teeth and subsequent periapical infection may lead to developmental defect in permanent teeth

The present study was carried out in pediatric patient of age group 4-10 years this age group of selected because the predecessor teeth were most likely to be present in the oral cavity. No significant finding in developing permanent tooth was found in patients having uninfected primary predecessor. The radiological finding to infected primary teeth with periapical bone destruction shows basically five types of changes in developing succedaneous teeth premature eruption (42.5%) torsion 26.67% crater like bone loss 20.83% bony sequestration 4.17% and crown dilacerations 2.5%.

Abscess group did exfoliate and erupt earlier than the control group i.e premature eruption. Premature eruption of succedaneous teeth was usually seen (42.50%) when their infected primary tooth have been accompanied by osteolysis or other alveolar bone loss. Although the succedaneous permanent teeth may erupt earlier, the dental development of the roots remained at a normal stage.

Lew (1989)⁴ reported that the root development of these teeth are usually completed about 2 to 3 year later for maxillary teeth and about 3 to 4 years later for mandibular teeth.

In the case presented, some maxillary and mandibular cuspids were already fully erupted in a six-year old patient, thus it is not unreasonable to suggest that the teeth could have erupted when the patient was at the age of about 4-5 years old. As the permanent cuspids usually erupt around the age of 11- to 12-years old, these cuspids had erupted approximately 7 to 8 years ahead of what has been considered normal eruption dates. The root development of the cuspids seen in this case is comparable to those seen in a 13- to 14-year-old; which again suggested that the development of the cuspids were approximately 7 to 8 years ahead of normal development.

Incidence of premature eruption was higher in posterior teeth (44.14%) than anterior (20%) and was near to significant. Possible cause of incidence of premature eruption is higher in posterior teeth than anterior teeth was that the normal exfoliation time of cuspids is 11-12 years and of anterior teeth is, 6-7 years. Thus time exposure of infected primary teeth on their developing succedaneous teeth is more in posterior teeth. No significant difference of premature eruption was seen in male (43.90%) and female (39.47%) and upper (45.16%) and lower (39.66%) teeth.

26.67% developing succedaneous teeth of infected primary molar groups show torsion.

Excessive osteolysis may result in a loosely hanging permanent dental sac. The torsion may be a result of excessive bone loss leading to tilting of developing tooth. The succedaneous crown was not surrounded by adequate alveolar bone. The extensive root resorptions and the presence of infections processes noted in this study' might be responsible for irregular eruption patterns. Shiere et al. (1961)⁵ and Lauterstein (1962)⁶ stressed the possibility of aberrant eruption of permanent teeth which were associated with infected primary teeth.

The incidence of torsion was significantly higher in female (39.47%) than male (20.73%) the incidence of torsion was higher in upper teeth (32.25%) than lower teeth (20.69%) and near to significant, this probably was related to the effect of gravity.

20.83% teeth of infected primary teeth showed crater, like bone loss. Crater like bone loss was seen due to excessive osteolysis of interradicular bone which may be a result of chronic dentoalveolar infection. Incidence of Crater like bone loss is higher in female (23.68%) than male (19.51%). Incidence of crater like bone loss was higher in lower teeth (27.59%) ($p > 0.08$) than upper teeth 14.52% and significant. This may be because of effect of gravity which play an important role in the spread of infection.

4.17% teeth of infected primary teeth show bone sequestration in interradicular area, bone sequestration seen in those cases

having advanced bone destruction and clinically presence of sinus in relation to those tooth.

2.5% developing succedaneous teeth of infected primary teeth show crown dilacerations.

Cordeiro MM (2005)⁷ reported morphological alteration on dental crown of developing permanent teeth as a consequence of inflammation or infection of primary predecessors.

Surprisingly 38.33% of developing succedaneous teeth of infected primary tooth group did not show abnormal finding. Here degree of irreversible damage to a succedaneous tooth from a diseased primary precursor can be influenced by following factors:

- The stage of development of the permanent tooth
- The virulence of the organism
- The host resistance .
- The duration of the infection

In the present study there was radiographic interpretation of changes. The difficulty of visualizing the normal and abnormal changes of three dimensional objects on a two dimensional surface is accepted. An enamel hypoplastic defect or enamel hypocalcification, however, can be radiographically projected to appear as such. This case illustrates such a diagnostic problem. If permanent teeth allowed to erupt, it is quite possible that the relationship between infection of primary teeth and its effect on permanent developing teeth could be observed more plainly in more instances, it is possible that some of the effects noted in this study would have been of greater magnitude if carried out longer. Thus, providing easier evaluation and a great range of possibilities.

If damage in primary teeth are advance and endodontic management will not be successful. One should go for extraction of primary teeth and space maintainer should be used to prevent space loss.

5. Conclusion

The present study confirmed that in patients with Infected primary teeth the developing succedaneous teeth exhibits premature eruption (42.50%), torsion (26.67%), Crater like bone loss (20.83%), Bony sequestration (4.17%) and Crown dilaceration (2.5%) amongst one hundred and twenty subjects.

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