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A Comparative Evaluation of Non-Instrumental Endodontic Treatment with Conventional Pulpectomies- A Clinical Trial.

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Abstract :
Deciduous dentition, though temporary in nature has immense importance in a child's development. . Premature loss of primary teeth due to pulpal inflammation may result in the following sequelae1 like loss of arch length, insufficient space for erupting permanent teeth, ectopic eruption and impaction of premolars and many more. But in many children conventional pulpectomies can not be done because of lack of cooperation on the dental chair. To find an effective, safer, simpler, less time consuming, non instrumental technique, requiring minimum expertise for treating pulpally involved primary teeth is very important.

Key words: ***NIET, Irreversible pulpitis, Tri antibiotic paste***

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I. Introduction

Human beings are diphyodent with two sets of dentition, namely deciduous & permanent dentition. Deciduous dentition, though temporary in nature has immense importance in a child's development. Finn describes the functions of the primary dentition as space maintenance, digestion, assimilation, speech development, stimulation of jaw growth, and cosmetics. Each of these functions must be taken into account in providing optimum dental treatment for the young patient. Inspite of innovation of techniques in prevention of dental disease, numerous deciduous teeth are lost prematurely due to pulpal inflammation which may be due dental caries, trauma and developmental defects. Premature loss of primary teeth due to pulpal inflammation may result in the following sequelae1 like loss of arch length, insufficient space for erupting permanent teeth, ectopic eruption and impaction of premolars, mesial tipping of molar teeth adjacent to primary molar loss, extrusion of opposing permanent teeth, shift of the midline with a possibility of development of cross-bite , development of certain abnormal tongue positions and also leading to malnutrition, improper growth & development and lack of confidence in general. Endodontic treatment of pulpally involved deciduous tooth can be a successful method of saving deciduous tooth upto its normal life span. Conventional endodontic treatment of deciduous teeth involves vital pulp therapy like pulp capping, pulpotomy and non vital pulp therapy like pulpectomy.

In the 19th century & in early part of 20th century only treatment for the pulpally involved deciduous teeth was extraction. The first approach to treat pulpally involved primary teeth was devitalization pulpotomy by Sweet in 1930. Sweet did multiple sitting pulpotomy using formocresol for the procedure. Pulpotomy therapy evolved slowly over the first 40 years and then the pace of change occurred since 1960s and continued to accelerate. , Sweet reduced the number of visits over the years, presumably because of economic and behavior management considerations, and in 1962, in affirmation of a common practice, Doyle et al. . used a two-visit procedure in their comparison study of formocresol and calcium hydroxide. Within a few years, Spedding et al. and Redig reported the results of a 5-min formocresol protocol, and since that time, complete mummification has been abandoned by the profession. Like pulpotomy, pulpectomy with zinc oxide eugenol was also described by Sweet in 1930. Since the 1930s, other authors had advocated the use of ZOE to fill the canals of primary teeth

requiring root canal therapy. First the most definitive and documented publication on endodontic procedures for the deciduous dentition in that period was written in 1953 by Rabinowitch. He treated 1363 cases and although his reported success rate was excellent (only 7 failures), his procedure involved an average of 7.7 visits for a nonvital and 5.5 for a vital tooth and treatment time ranged from four to seventeen visits. The first reported one-visit pulpectomy study was in 1972 on 39 primary molars filled with ZOE.

II. Aim And Objectives

To evaluate the individual efficacy & also to compare the clinical & radiological outcome of non instrumentation endodontic treatment with conventional pulpectomies of pulpally involved primary teeth.

To find an effective, safer, simpler, less time consuming, non instrumental technique, requiring minimum expertise for treating pulpally involved primary teeth. In broader perspective this will prevent loss of arch length, insufficiency of space in the dental arch & malocclusion as a whole. Thus maintaining oral & overall health of the children

III. Materials & Methods

A) STUDY SETTING: Department of Pedodontics& Preventive Dentistry, Guru Nanak Institute of Dental Science & Research, Panihati, Kolkata-114

B) TIME LINES: 1. Duration of the complete study: January 2014 to August 2015 approximately. 2. Duration of follow- up of each case: one week post operatively then 1month, 3months, 6months & 12months.

C) DEFINITION OF PROBLEM: To evaluate and compare the effectiveness of non instrumentation endodontic treatment with conventional pulpectomies in carious, pulpally involved deciduous molar teeth.

D) DEFINITION OF POPULATION: 40 children aged 4-9 years having 45 pulpally involved, but restorable primary molar teeth reported to the department of Pedodontics& Preventive Dentistry, Guru Nanak Institute of Dental Science & Research, Panihati, Kolkata.

E) INCLUSION EXCLUSION CRITERIA:

1. INCLUSION CRITERIA: Patients with carious pulpally involved deciduous molar teeth which are restorable. Teeth with adequate remaining coronal structure for rubber dam application. Absence of radiographic signs of internal root resorptio Teeth with minimum furcation radiolucency. Absence of pathological mobility. Teeth without perforation of pulpal floor.

2. EXCLUSION CRITERIA: Patients with systemic diseases. Patients who are allergic to local anaesthetics. Patients with a h/o allergy to antimicrobials used in 3 Mix paste. Teeth with perforation of pulpal floor. Primary tooth with no permanent successor. Teeth which are non-restorable.

F)SAMPLE SIZE:

45 no. of deciduous 1st & 2nd molar teeth were included in the study.

G) SAMPLE DESIGN: 45 selected teeth were divided into three groups (15 for each group randomly) i.e. Group I: Pulpectomy with ZOE, Group II : pulpectomy with Materials & Methods 44 calcium hydroxide and iodoform paste (metapex) & Group III : Non instrumentation endodontic treatment (NIET) using tri-mix paste.

H) CONTROL REQUIRED OR NOT: Not required I)

EXPERIMENT DESIGN: The study was conducted in the clinics of Department of Pedodontic¬ & Preventive Dentistry, Guru Nanak Institute of Dental Science & Research Panihati, Kolkata.

Ethical committee clearance was obtained from concerned authorities. Patients were selected on the basis of inclusion & exclusion criteria already mentioned and grouped into group I, group II and group III. Informed written consent was obtained from the parents

GROUP-I Fifteen Primary molar were treated with conventional ZOE pulpectomy procedure. Local anaesthesia (2% lignocaine with 1:80000 adrenaline Lignox,Warren) given. Isolation is achieved with the help of Rubber dam (company) and sterile¬ disposable plastic saliva ejector attached with high volume suction device. Access cavity was prepared with round & tapered fissure bur (Mani) in high speed airotor handpiece (NSK). Complete amputation of coronal pulp using spoon excavator (Densply¬ Mallifer) was done to gain entrance into the root canal identified at the floor of pulp chamber. Pulp tissue from root canals was extirpated using number 15, 20 barbed broach (Mani), one at a time. Working length established 1 mm short of apex by inserting 15 no K file (Mani) with the help of radiovisiography (SOPIX, SATELAC). Following which biomechanical preparation was done using K files upto 30 size, with frequent irrigation with normal saline(Albert Davis). The canals were dried using sterile absorbent paper points (Diadent) for obturation with a paste of Zinc Oxide powder & liquid (DPI) mixed to medium consistency, delivered using hand lentulospirals (Mani) The material was finally condensed using endodontic pluggers (GDC) and cotton moistened with normal saline. Postoperative radiovisiograph was taken after completion of procedure. Access cavity was filled with GIC (Fuji II) and post operative instruction¬ given. The tooth was then restored after 7 days with stainless steel crown (3M).

GROUP-II : Fifteen Primary molars were treated with metapex (calcium hydroxide iodoform paste) pulpectomy procedure. Local anaesthesia (2% lignocaine with 1:80000 adrenalineLignox,Warren) was given. Isolation was achieved with the help of Rubber dam & sterile disposable saliva ejector attached with high volume suction device. Materials & Methods 46 Access cavity was prepared with round & tapered fissure bur (Mani) in high speed airotor handpiece (NSK). Complete amputation of coronal pulp using spoon excavator (Densply Mallifer) was done to gain entrance into the root canal identified at the floor of pulp chamber. Pulp tissue extirpation was done using no. 15, 20 barbed broach (Mani), one at a time. Working length was established 1 mm short of apex by inserting 15 no¬ K file (Mani) in Radiovisiograph (SOPIX, SATELAC) Following which bio mechanical preparation was done using K files upto 30 size, with frequent irrigation with normal saline (Albert Davis). The canals were dried using sterile absorbent paper points (Diadent). Root canal filling was done with metapex delivered into the canals using hand lentulospirals (Mani) and the material was finally condensed using endodontic pluggers (GDC) and cotton moistened with normal saline. Post-operative radiovisiograph was taken after completion of procedure. The tooth was restored with GIC (Fuji II) and post operative instructions were given. The tooth was then restored after 7 days with stainless steel crown (3M).

GROUP III: 15 randomly selected primary molars were taken for non instrumentation endodontic treatment.
Preparation of tri-mix: One Ciprofloxacin 500 mg tab (CifranRanbaxy,Sun Pharma), one Metronidazole 400 mg tab (Metrogyl-JB Chemicals) and one Amoxycillin 500 mg cap (Mox-Ranbaxy,Sun) were taken. Coating of tablets of Ciprofloxacin & Metronidazole was removed with a sterile Berd Parker blade. Then they were crushed individually to powder with the help of a sterile mortar & pestle. Gelatin coating of capsule Amoxycillin was removed & powder was collected. Then equal amounts of powder (100mg) of each antimicrobial measured in a digitalised weighing machine & mixed with normal saline in a sterile glass slab. A freshly prepared paste was used during each case and the left- overs were discarded after every procedure. Local anaesthesia (2%lignocaine with 1:80000 adrenaline Lignox, warren) was given. Isolation was achieved with the help of Rubber dam¬ & sterile disposable plastic saliva ejector attached with high volume suction device . Removal of caries was done using sharp spoon excavator (Mallifer). Access cavity was prepared with round & tapered fissure bur (Mani) attached with air rotor hand piece(NSK)
Removal of coronal pulp was performed by sharp spoon excavator. Before application of the freshly prepared tri-antibiotic paste to the pulpal floor, the orifice of the root canal was enlarged to form a medication cavity(1mm diameter& 2mm depth approximately) as a receptacle for the medication with the help of Gates-Glidden drill. Materials & Methods 48 Irrigation was performed using normal saline. Haemorrhage if present controlled by application of cotton pellet immersed in sodium hypochloride (5.2%) then dried Tri-mix paste applied with plastic filling instruments over the pulpal floor and in the medication cavity. The tooth was then sealed with zinc oxide eugenol cement & post operative Radio Visio Graph (company) was taken after completion of procedure. Access cavity was filled with GIC (Fuji-II) and post operative instruction given. Semi permanent restoration was done by cementing stainless steel crown (3M) on the second appointment after 7 days on the treated teeth.
The children were recalled for post-operative clinical evaluation at 1 week interval, and clinical& radiological evaluation at 1 , 3 , 6 ,9 and 12 months interval.

J) LABORATORY INVESTIGATION: Not required

K) PARAMETERS TO BE STUDIED: Patients were evaluated after 1 week interval (clinical follow up) and clinical & radiographic evaluation was done at 1, 3, 6,9 and 12 months postoperatively.

1.Clinical criteria indicating successful treatment:
absence of pain
absence of tenderness on percussion,
absence of swelling,red ness and sinus/ fistula)and the absence of abnormal mobility.

2. Evaluation criteria for radiographic success:
radiographic continuity of the lamina dura,
reduction in the size of any pathologic inter-radicular and/ or furcal radiolucency or evidence of bone regeneration.
absence of internal or external root resorption¬
The overall success of treatment was indicated when both clinical & radiographic criteria were fulfilled.

L) DEFINITION OF OUTCOME: The study was to assess & evaluate an inexpensive, effective, noninstrumental and simple alternative to conventional pulpectomy procedures.

M) STATISTICAL ANALYSIS: Statistical Analysis was performed with help of Epi Info (TM) 3.5.3 of the Centers for Disease Control and Prevention (CDC). Using this software, basic cross-tabulation and frequency distributions were prepared. Test was used to test the association between different study variables under study. Test of proportion (Z-test) was used to test the significant difference between two proportions. $p \leq 0.05$ was considered statistically significant.

GENERAL PROCEDURES FOR GROUP 1, GROUP 2 AND GROUP 3.
Figure 2A: Carious tooth
GENERAL PROCEDURES FOR GROUP 1, GROUP 2 AND GROUP 3. Figure 2A: Carious tooth Figure 2B: Access cavity Figure 2C: Final restoration with S.S. Crown Materials & Methods 54 MATERIALS AND INSTRUMENTS USED FOR NIET AND PULPECTOMY Figure 3A & 3B: Study armamentarium MATERIALS AND INSTRUMENTS USED FOR STAINLESS STEEL CROWN Figure 4: Armamentarium for S.S. Crown Materials & Methods 55 ROOT CANAL FILLING MATERIAL USED FOR GROUP 1 & GROUP 2 Figure 5: Zinc oxide euginol Figure 6: Metapex MATERIALS USED FOR GROUP 3 Figure 7: Materials used in Tri-mix paste Materials & Methods-Case Album 5

IV. Results

In table 1 all the cases of the three groups presented with pain, majority of cases presented with tenderness on percussion, a few cases showing gingival swelling and abnormal mobility.
Table 2 showed that majority of study samples having furcal radiolucency but only two in group 3 having abnormal root resorption .
Table number 3(A) showed the presence of different clinical signs and symptoms 1 month post-operatively. There was marked improvement of all the group
Table number 3(B) showed there was marked improvement i. e. 100% in group 1(ZnOE) and group 2 (METAPEX) as 15 teeth in both the groups and 13 teeth (86.67%) in group 3(NIET) were clinically asymptomatic.
Test of proportion (z test) showed that clinical success rate at 1month of group 1(100%) and group 2 (100%) were higher than that of group 3(86.67%) but not statistically significant(Z= 1.4639 ;p value-0.07215)
Table number 4(A) showed the presence of different radiological signs and symptoms 1 month post-operatively. There was improvement of majority of the cases.
Table number 4(B) showed there was marked improvement i. e. 86.67% in group 1(ZnOE) and group 2 (METAPEX) and 66.67% in group 3(NIET) were radiographically asymptomatic.
Test of proportion (z test) showed that radiographical success rate at 1month of group 1 and group 2 (86.67%) was higher than that of group 3(66.67%) but not statistically significant(Z= 1.295 ;p value-0.19706)
Table number 5(A) showed the presence of different clinical signs and symptoms 1 month post-operatively. There was marked improvement of all the group
Table number 5(B) showed there was marked improvement i. e. 100% in group 1(ZnOE) and group 2 (METAPEX) as 15 teeth in both the groups and 14 teeth (93.33%) in group 3(NIET) were clinically asymptomatic. Only 1 case in group 3 showed slight tenderness on percussion.
Test of proportion (z test) showed that clinical success rate at 3month of group 1(100%) and group 2 (100%) were higher than that of group 3(93.33%) but not statistically significant(Z= 1.0171 ;p value-0.30772)
Table number 6(A) showed the presence of different radiological signs and symptoms at 3 month post-operatively. There was improvement of majority of the cases. In gr.1 and gr.2 furcal radiolucency was present in 2 and 1 cases respectively. But in gr. 3 five study samples had furcal radiolucency, and among them 3 samples had abnormal root resorption
Table number 6(B) showed success rate of group 1(ZnOE) - (86.67%) and group 2 (METAPEX)-(93.33%) were higher than group 3(NIET)-(66.67%).
Test of proportion (z test) showed that there was no statistically significant difference (Z-Score is -0.6086. The p-value is 0.54186) of success rate between group 1 & group2.
Test of proportion (z test) showed that there was no statistically significant difference (Z-Score is 1.8257. The p-value is 0.06724) of success rate between group 2 & group3.
Test of proportion (z test) showed that there was no statistically significant difference (Z-Score is 1.295, The p-value is 0.19706) of success rate between group 1 & group3 .
Table no 7(A) shows gr.3 one study sample had both pain & tenderness on percussion and one had only tenderness on percussion.
Table no 7 (B) shows Test of proportion (z test) showed that there was no statistically significant difference (Z-Score is -1.0171. The p-value is 0.30772) of success rate between group 1 & group2.
Test of proportion (z test) showed that there was no statistically significant difference (Z-Score is 1.4639. The p-value is 0.1443) of success rate between group 2 & group3.
Test of proportion (z test) showed that there was no statistically significant difference (Z-Score is 0.6086, The p-value is 0.54186) of success rate between group 1 & group3.
Table 8(A) shows **In group 1 three study samples had furcal radiolucency and among them one had abnormal root resorption.**
In group 2 only one study sample had furcal radiolucency
In group 3 five study samples had both abnormal root resorption & furcal radiolucency both

TABLE 8 (B) Test of proportion (z test) showed that there was no statistically significant difference (Z-Score is -1.0742. p-value is 0.28462) of success rate between group 1 & group2.
Test of proportion (z test) showed that there was no statistically significant difference (Z-Score is 1.8257. p-value is 0.06724) of success rate between group 2 & group3.
Test of proportion (z test) showed that there was no statistically significant difference (Z-Score is 0.8257, p-value is 0.40654) of success rate between group 1 & group3.
Table 9(A) showed that one sample of group 1 had pain & tenderness on percussion. In group 2, 15 samples were clinically asymptomatic. In group 3, two samples had both pain & tenderness on percussion among them 1 had gingival swelling.
Table 9 (B) Test of proportion (z test) showed that there was no statistically significant difference (Z-Score is -1.0171. The p-value is 0.30772) of success rate between group 1 & group2.
Test of proportion (z test) showed that there was no statistically significant difference (Z-Score is 1.4639. The p-value is 0.1443) of success rate between group 2 & group3.
Test of proportion (z test) showed that there was no statistically significant difference (Z-Score is 0.6086, The p-value is 0.54186) of success rate between group 1 & group3.
Table 10 (A) shows **In group1, two study samples had furcal radiolucency & among them one had root resorption.**
In group 2, one study samples had furcal radiolucency
In group 3, six study samples had furcal radiolucency & among them five had root resorption. Total no. of study samples within bracket.
Table 10 (B) shows Test of proportion (z test) showed that there was no statistically significant difference (z score -0.6086. The p-value is 0.54186) of success rate between group 1 & group2 .
Test of proportion (z test) showed that there was statistically significant difference (Z-Score is 2.1583. The p-value is 0.03078) of success rate between group 2 & group3.
Test of proportion (z test) showed that there was no statistically significant difference(Z-Score is 1.6514. The p-value is 0.09894) of success rate between group 1 & group 3.
Table 11 (A) shows **In group 1, 1case had tenderness on percussion. In group 2, all cases were clinically asymptomatic. In group 3, three cases had tenderness on percussion among them two had both pain & swelling which were undergone pulpectomy later on.**
Total no. of study samples within bracket.
Table 11 (B) shows Test of proportion (z test) showed that there was no statistically significant difference (Z-Score is -1.0171. The p-value is 0.30772) of success rate between group 1 & group2.
Test of proportion (z test) showed that there was no statistically significant difference (Z-Score is 1.8257. The p-value is 0.06724) of success rate between group 2 & group3.
Test of proportion (z test) showed that there was no statistically significant difference (Z-Score is 1.0742. The p-value is 0.28462) of success rate between group 1 & group3.
Table 12 (A) shows **In group 1 two samples had furcal radiolucency & among them one had abnormal root resorption.**
In group 2 one had furcal radiolucency & abnormal root resorption.
In group 3 six had furcal radiolucency & among them five had abnormal root resorption.
Total no. of study samples within bracket.
Table 12 (B) shows Test of proportion (z test) showed that there was no statistically significant difference (z score -0.6086. The p-value is 0.54186) of success rate between group 1 & group2.
Test of proportion (z test) showed that there was statistically significant difference (Z-Score is 2.1583. The p-value is 0.03078) of success rate between group 2 & group3.
Test of proportion (z test) showed that there was no statistically significant difference (Z-Score is 1.6514. The p-value is 0.09894) of success rate between group 1 & group3.

V. Discussion & Conclusion

One of the most valuable services a paediatric dentist can provide for the child patient is adequate treatment of pulpally involved primary teeth. 64 Maintaining the integrity and health of oral tissues is the primary objective of pulp treatment. Conservative treatments are recommended for primary teeth whose pulps have the potential to recover once the irritation is removed. Because early loss of primary teeth can cause number of problems, such as ectopic eruption, disturbance of eruption sequence, drifting of erupted teeth, space loss for the successor permanent teeth, development of aberrant habits such as tongue thrusting, alterations in speech, and impairment of function. 25 Thus it is important that primary dentition should be maintained in the dental arch, provided it can be restored to function and remain free from the disease. An intact tooth successfully disinfected and restored clinically is a superior space maintainer than an appliance. To accomplish this endodontic treatment or pulpectomy has to be done. But proper biomechanical preparation and total elimination of bacteria from

infected primary root canals is not possible due to anatomical complexities of primary root canal system (i.e. long, slender and tortuous roots with lateral and accessory canals) and low co-operation level of many young children. Thus, in the present study non-instrumentation endodontic treatment was evaluated and the result of the present study are as follows: Clinical success rate of group 1 at 1 month, 3 months , 6 months,ϖ 9months and 12 months are 100%, 100%, 93.33%, 93.33% and 93.33% respectively.

VI. Summary & Conclusion

Group III (NIET) can be a safe, effective, simple option in contrary to conventional endodontic treatment, while treating pulpally involved primary teeth. It can be concluded through the study that non-instrumentation endodontic treatment using tri- mix paste can be used successfully, safely, and effectively in pulpally involved primary molars specially when co-operation of child patient is a challenge. Long duration study on a larger population and study samples can be performed with varying proportions of medicaments in future, to further enrich the effectivity of the study technique.

TABLES

Table 1

GROUP	PAIN	TENDERNESS ON PERCUSSION	SWELLING	MOBILITY
GROUP-1	15	12	3	0
GROUP-2	15	12	4	0
GROUP-3	15	14	3	2

Table 2

GROUP	PERIRADICULAR/ FURCAL RADIOLUCENCY	ABNORMAL ROOT RESORPTION
GROUP-1	12	0
GROUP-2	11	0
GROUP-3	14	2

Table 3(A)

GROUP	PAIN	TENDERNESS ON PERCUSSION	SWELLING	ABNORMAL MOBILITY
GROUP-1	0	0	0	0
GROUP-2	0	0	0	0
GROUP-3	0	2	1	0

Table 3(B)

GROUP	FURCAL RADIOLUCENCY	ABNORMAL ROOT RESORPTION
GROUP 1	2	0
GROUP 2	2	0
GROUP 3	5	2

Table 4(A)

GROUP	NO. OF FAILURE	NO. OF SUCCESS	SUCCESS RATE
GROUP-1	0	15	100%
GROUP-2	0	15	100%
GROUP-3	2	13	86.67%

Table 4(B)

GROUP	FURCAL RADIOLUCENCY	ABNORMAL ROOT RESORPTION
GROUP 1	2	0
GROUP 2	2	0
GROUP 3	5	2

Table 5(A)

GROUP	NO FAILURE	NO OF SUCCESSS	SUCCESS RATE (%)
GROUP 1	2	13	86.67%
GROUP 2	2	13	86.67%
GROUP 3	5	10	66.67%

Table 5(B)

GROUP	PAIN	TENDER ON PERCUSSION	SWEELING	ABNORMAL MOBILITY
GROUP-1	0	0	0	0
GROUP-2	0	0	0	0
GROUP-3	0	1	0	0

Table 6(A)

GROUP	NO. OF FAILURE	NO. OF SUCCESS	RATE OF SUCCESS
GROUP-1	0	15(15)	100%
GROUP-2	0	15(15)	100%
GROUP-3	1	14(15)	93.33%

Table 6(B)

GROUP	FURCAL RADIOLUCENCY	ABNORMAL ROOT RESORPTION
GROUP 1(ZOE)	2(15)	0
GROUP 2(METAPEX)	1(15)	0
GROUP 3(NIET)	5(15)	3

Table 7(A)

GROUP	NO. OF FAILURE	NO. OF SUCCESSS	SUCCESS RATE (%)
GROUP 1	2	13	86.67%
GROUP 2	1	14	93.33%
GROUP 3	5	10	66.67%

Table 7(B)

	PAIN	TENDER ON PERCUSSION	SWELLING	ABNORMAL MOBILITY
GROUP 1	0(15)	1(15)	0(15)	0(15)
GROUP 2	0(15)	0(15)	0(15)	0(15)
GROUP 3	1(15)	2(15)	0(15)	0(15)

Table 8(A)

GROUP	NO. OF FAILURE	NO OF SUCCESSS	SUCCESS RATE (%)
GROUP 1	1	14(15)	93.33%
GROUP 2	0	15(15)	100%
GROUP 3	2	13	86.67%

Table 8(B)

GROUP	PERIRADICULAR/FURCAL RADIOLUCENCY	ABNORMAL ROOT RESORPTION	
GROUP-1	3(15)	1(15)	
GROUP-2	1(15)	0(15)	
GROUP-3	5(15)	5(15)	

Table 9 (A)

GROUP	NO.OF FAILURE	NO. OF SUCCESS	SUCCESS RATE
GROUP-1	3(15)	12(15)	80%
GROUP-2	1(15)	14(15)	93.33%
GROUP-3	5(15)	10(15)	66.67%

Table 9 (B)

GROUP	PAIN	TENDERNESS ON PERCUSSION	SWELLING	ABNORMAL MOBILITY
GROUP-1	1(15)	1(15)	0(15)	0(15)
GROUP-2	0(15)	0(15)	0(15)	0(15)
GROUP-3	2(15)	2(15)	1(15)	0(15)

Table 10 (A)

GROUP	NO.OF FAILURE	NO.OF SUCCESS	RATE OF SUCCESS
GROUP-1	1	14(15)	93.33%
GROUP-2	0	15(15)	100%
GROUP-3	2	13(15)	86.67%

Table 10(B)

GROUP	FURCAL/PERIRADICULAR RADIOLUCENCY	ABNORMAL ROOT RESORPTION
GROUP-1	2(15)	1(15)
GROUP-2	1(15)	0(15)
GROUP-3	6(15)	5(15)

Table 11(A)

GROUP	NO.OF FAILURE	NO. OF SUCCESS	RATE OF SUCCESS
GROUP-1	2(15)	13(15)	86.67%
GROUP-2	1(15)	14(15)	93.33%
GROUP-3	6(15)	9(15)	60%

Table 11(B)

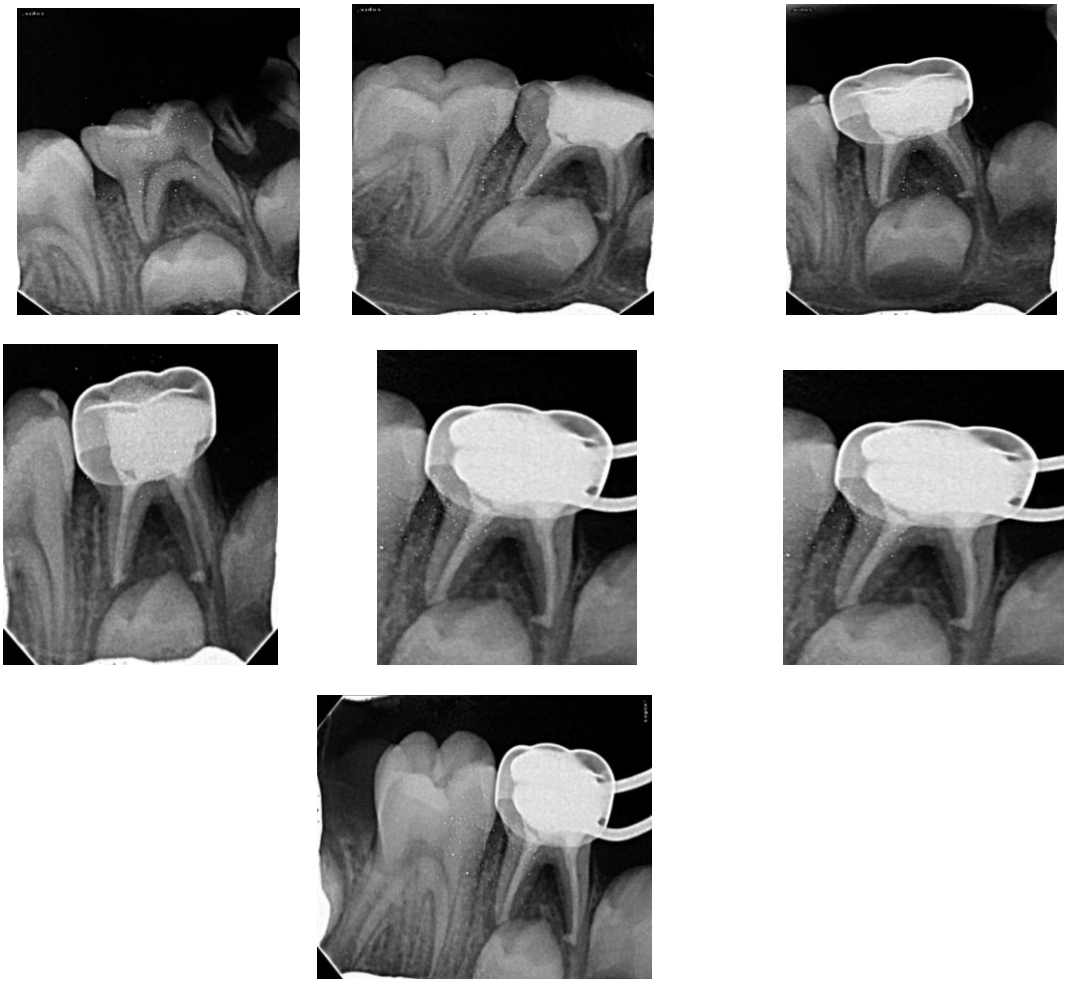
GROUP	PAIN	TENDERNESS ON PERCUSSION	SWELLING	ABNORMAL MOBILITY
GROUP-1	0(15)	1(15)	O(15)	0(15)
GROUP-2	0(15)	0(15)	0(15)	0(15)
GROUP-3	2(15)	3(15)	2(15)	0(15)

Table 12(A)

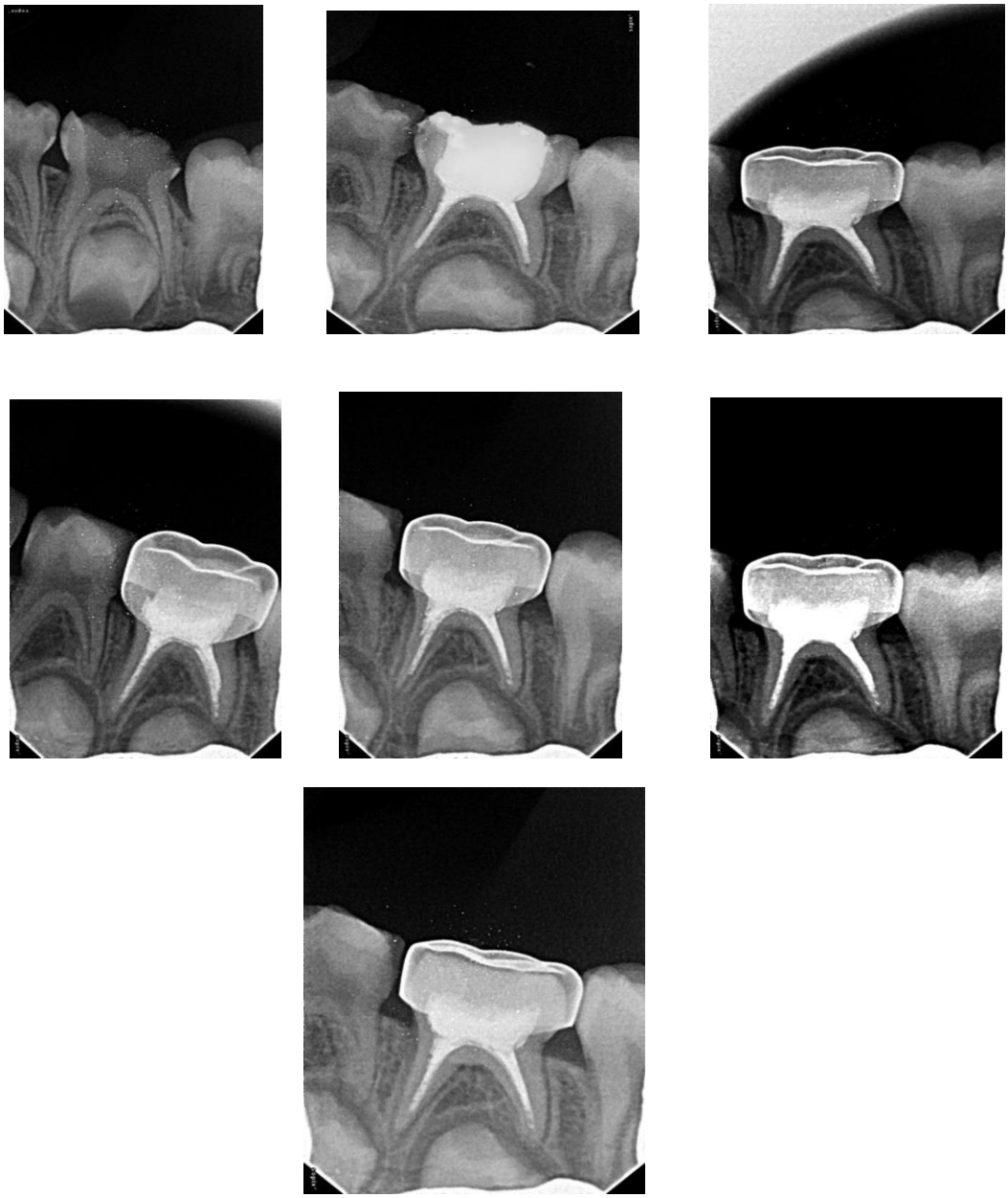
GROUP	NO. OF FAILURE	NO. OF SUCCESS	RATE OF SUCCESS
GROUP-1	1(15)	14(15)	93.33%
GROUP-2	0	15(15)	100%
GROUP-3	3(15)	12(15)	80%

Table 12(B)

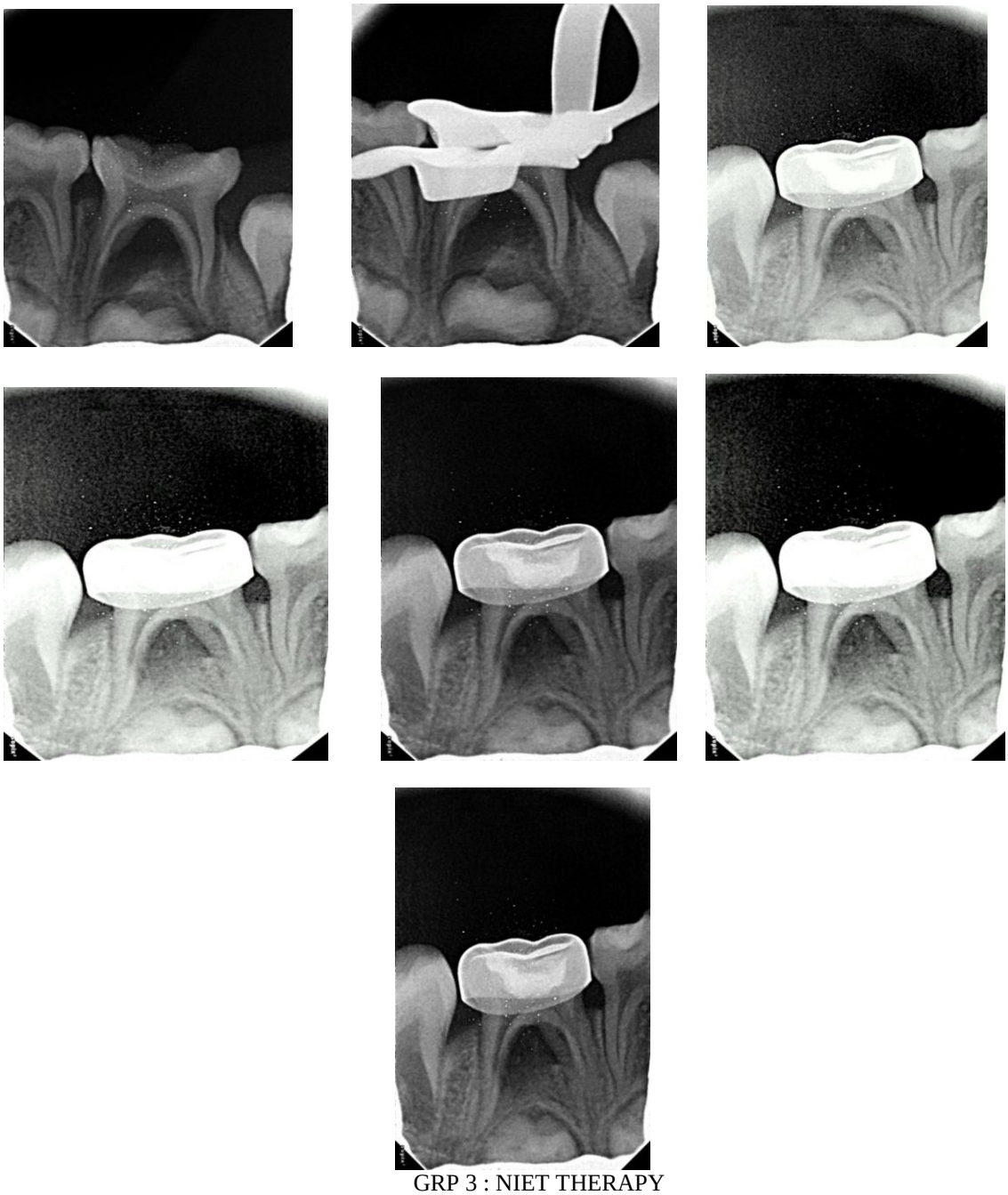
GROUP	FURCAL/PERIRADICULAR RADIOLUCENCY	ABNORMAL ROOT RESORPTION
GROUP-1	2(15)	1(15)
GROUP-2	1(15)	1(15)
GROUP-3	6(15)	5(15)



GRP 1 : OBTURATION WITH ZOE



GRP 2: OBTURATION WITH METAPEX



GRP 3 : NIET THERAPY