COMPARISON OF EFFECTIVENESS OF TRIPLE ANTIBIOTIC PASTE(3MIX) AND VITAPEX FOR ROOT CANAL TREATMENT OF PULPALLY INVOLVED PRIMARY MOLARS

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2BADER MUNIR
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ABSTRACT

The objective of this study was to compare the effectiveness of 3MIX and Vitapex (calcium hydroxide and iodoform paste) for root canal treatment of pulpally involved primary molars.

This randomized clinical trial was conducted at Outpatient Department of Operative Dentistry at de Montmorency College of Dentistry, Lahore. A total of 100 patients with inter – radicular and periapical radiolucency on periapical radiograph of primary molars were included in this study.

Patients were divided into two groups randomly, group A (3MIX) and group B (Vitapex). For group A (n=50) 3MIX was prepared, pulp was removed and 3MIX was placed on orifice of canals. In Group B (n=50), root canal length was determined by radiograph, pulp removed and Vitapex was filled directly in canals with pre mixed syringe. Zinc oxide eugenol was used to fill pulp chambers. In both groups tooth was restored with glass ionomer cement.

Both groups were evaluated radiographically after 6 months. The overall effectiveness in terms of absence of radiolucency in Group A was 90% and in Group B was 70%. Absence of periapical radiolucency was significantly higher in Group A than Group B (P value 0.02).

Based on the result of this study, it was concluded that 3 MIX is significantly more effective in the treatment of pulpally involved primary molars as compared to Vitapex.

Key Word: Lesion sterilization and tissue repair therapy( LSTR), root canal treatment, Vitapex, triple antibiotic paste( 3MIX).

INTRODUCTION

The primary goal of endodontic treatment in primary teeth where pulp is affected by caries, trauma or other causes, is to eliminate infection and to retain the tooth in functional state until their normal exfoliation time without endangering the permanent tooth or the general health of the child.1,2 The maintenance of the primary dentition is vital for proper development, maturation and growth of facio - skeleton of the child.2

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Premature loss of primary tooth may result in ectopic eruption sequence, drifting of permanent teeth, space loss for permanent teeth, development of habits such as tongue thrusting, aberration in speech and impairment of function.2,3,4,5

An intact primary tooth is a superior space maintainer than an appliance. To accomplish this many treatment procedures have been proposed such as direct pulp capping, indirect pulp capping, partial pulpotomy, pulpotomy and pulpectomy.3,4,5 The complex morphology of the root canal system in primary teeth makes it difficult to achieve proper chemo mechanical preparation.1,2,3

Various root canal filling materials used for primary teeth are; zinc oxide eugenol, iodoform containing pastes such as Kri paste (iodoform, camphor, menthol and parachlorophenol), Maisto paste (iodoform, camphor, menthol, parachlorophenol, zinc oxide, lanolin and thymol), Guedes-Pinto paste (iodoform, camphorated parachlorophenol), Rifocort (prednisolone, iodoform, zinc oxide, calcium hydroxide, barium sulphate, eu-
genol and parachlorophenol), Vitapex, Metapex and 3(MIX).\textsuperscript{1,2,3,4,5,6,7}

Vitapex is a pre-mixed calcium hydroxide and iodoform paste and is nearly an ideal root canal filling material with radiographic success rate of 72.5\% at 6 months postoperatively. It has several disadvantages like re-infection when resorbed early and low anti-bacterial effect when compared with other materials.\textsuperscript{1,4,6,7}

Lesion sterilization and Tissue Repair Therapy (LSTR) is a new biologic approach in treatment of carious lesions with or without pulpal or periapical involvement by local application of an anti-bacterial drug combination which includes metronidazole, ciprofloxacin and minocycline (3MIX). The repair of damaged tissue is expected when lesions are fully disinfected. It has success rate of 92\% at 6 months.\textsuperscript{2,3,4,5,7,8,9,10,11,12,13} There is no local study available. The objective of the study is to compare the effectiveness of triple antibiotic paste (3MIX) and Vitapex for root canal treatment of pulpally involved primary molars.

**METHODOLOGY**

The randomized clinical trial was carried out in outpatient Department of Operative Dentistry in Punjab Dental Hospital, Lahore from 1st September 2012 to 28 February 2013. The sample size was calculated to be 100 by using WHO recommended sample size determination software and by considering the reference article. Informed verbal consent was taken from each patient and those who refused to give consent, were excluded from the study. The inclusion criteria were: patients of both gender of age between 3-8 years, presence of pain and gingival swelling in primary molars, inter – radicular or periapical radiolucency on periapical radiograph, pulpotomised tooth failure assessed by periapical radiograph. The exclusion criteria were, excessive root resorption involving half of root or pulpal floor assessed by periapical radiograph, history of allergy to metronidazole, ciprofloxacin or minocycline.

All the procedures were performed under supervision of Consultant. No ethical issue or risk was be involved to the patient. Tooth was isolated by rubber dam and local anesthesia was used if necessary. Patients were allotted to two groups by lottery method to either group A (3MIX) or to group B (Vitapex).

For group A (n=50), 3MIX was prepared. The mixed drugs were combined with macrogol and propylene glycol to form an ointment. Pulp was removed with sharp spoon excavator and cavity irrigated with 2.5\% NAOCL. Haemorrhage was controlled with 10\% NAOCL stump held for 10 minutes. Cavity was dried and 3MIX was placed on orifice. The tooth was restored with glass ionomer cement.

In Group B (n=50), root canal length was determined by radiograph and filing was carried out 2 to 3 mm short of radiographic apex. Canals were dried with sterile paper points. Vitapex was filled directly in canals with pre mixed syringe. Zinc oxide eugenol was used to fill pulp chamber and tooth was restored with glass ionomer cement.

Both groups were evaluated radiographically after 6 months. Reduction in inter – radicular or periapical radioluency was checked after 6 months and effectiveness was labeled in terms of absence of inter- radicular or periapical radioluency.

Data was entered in SPSS version 11.0. The variables were patient’s age, gender and effectiveness of medicaments. Mean and standard deviation was evaluated for numerical variables like age of patient. Frequency and percentage was calculated for patients gender and effectiveness in terms of absence of peri-apical radioluency. The comparison of effectiveness was made using Chi-Square Test (X2). P-value of 0.05 or less was considered as significant.

**RESULTS**

The overall effectiveness in terms of absence of radioluency in Group A was 90\% and in Group B 70\%. Absence of periapical radioluency was significantly higher in Group A than Group B (P value 0.02) as shown in Table 1.

Hundred patients were treated. Forty-six were males (46\%) and 54 were female (54\%). The age of patients ranged between 3 to 8 years and mean age was 3.54 years and standard deviation was 1.69. Comparison between age and effectiveness of technique showed that

<table>
<thead>
<tr>
<th>Group</th>
<th>Effectiveness (Yes)</th>
<th>Effectiveness (No)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 MIX n=50</td>
<td>45</td>
<td>5</td>
<td>0.02</td>
</tr>
<tr>
<td>Vitapex n=50</td>
<td>35</td>
<td>15</td>
<td></td>
</tr>
</tbody>
</table>

**TABLE 2: ANALYSIS OF AGE**

<table>
<thead>
<tr>
<th>Mean age ± S.D.</th>
<th>3.54±1.69</th>
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</thead>
<tbody>
<tr>
<td>Minimum</td>
<td>3 year</td>
</tr>
<tr>
<td>Maximum</td>
<td>8 year</td>
</tr>
<tr>
<td>P-value</td>
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</tr>
</tbody>
</table>

**TABLE 3: GENDER AND EFFECTIVENESS**

<table>
<thead>
<tr>
<th>Gender</th>
<th>Yes</th>
<th>No</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>45</td>
<td>9</td>
<td>54</td>
</tr>
<tr>
<td>Male</td>
<td>35</td>
<td>11</td>
<td>45</td>
</tr>
<tr>
<td>Total</td>
<td>80</td>
<td>20</td>
<td>100</td>
</tr>
</tbody>
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there was no significant relationship between them and P value was insignificant 0.1 (Table 2). Comparison between effectiveness and gender showed that there is no significant relationship between them and P value was 0.4. (Table 3). Out of 100 patients 80 patients showed effectiveness after 6 months. Comparison of effectiveness in terms of absence of radiolucency between Group A and Group B showed significant relationship between them and P value was 0.02.

DISCUSSION

Hermann introduced calcium hydroxide. Calcium hydroxide has been used either as the sole root filling material for primary teeth or in association with iodoform. It is commercially available as Vitapex and Metapex. These products resorb if inadvertently pushed beyond the apex. However, the rate of resorption of the material from within the canals is faster than the rate of physiologic root resorption.10

The alkaline property of the material counteract the inflammatory process by acting as a local buffer and by activating the alkaline phosphatase activity, which is important for hard tissue formation. The depletion of the material from the root canals was found to be the main disadvantage of Calcium Hydroxide as root canal filling material. Studies have reported a success rate of 80 to 90%.1,2,7,9,10 Japanese researchers have introduced a calcium hydroxide sealer named Vitapex that contains 40% iodoform along with silicone oil. The iodoform is a known bactericide that is released from the sealer and suppresses any residual bacteria in the canal or periapical region. Several clinical and histopathologic investigations of calcium hydroxide and iodoform mixture (Vitapex, Neo Dental Chemical Products Co. Tokyo) have been published by Fuchino and Nishino (1980). This material was found to be easy to apply and resorbs at a slightly faster rate than that of the root. It has no toxic effects on permanent successor and is radiopaque. For these reasons, the calcium hydroxide - iodoform mixture can be considered to be a nearly ideal primary tooth root filling material.4,10

The radiographic success rate in this study was 70% after 6 months according to the set criteria. In a study by Trairatvorakul C et al (2008), in which they compared the clinical and radiographic success rate of ZOE and Vitapex, the radiographic success rate of Vitapex after 6 month was 78%.11 In a study by Ramar K and Mungra K, the radiographic success rate of calcium hydroxide/iodoform paste (metapex/vitapex) was found to be 72.5%.6

Vitapex has some disadvantages like irritation to periapical tissue if extruded beyond apex and has less antimicrobial properties.1 The lesion sterilization and tissue repair technique (LSTR) hypothesis proposes that the local application of antimicrobial agents, such as the 3Mix-MP combination would disinfect the lesions by eradicating bacteria in dentinal or pulpal lesions.4,5,7,12,13,14,15 This procedure has no mechanical instrumentation, thus prevents over enlargement of root canal and unnecessary irritation of periapical tissue.4,5,7

In the present study effectiveness (radiographic success) of 3 Mix in terms of absence of periapical radiolucency was 90%. In study done by Nakorchai et al the radiographic success at 6 months was 84%, which was prospective single blinded randomized study.1 In another study by Duandan A et al, the radiographic success in 3MIX was 86.6% at 6 month follow up period.14

The radiographic success in this study was higher than study of Takushige et al which was 80%.16 The difference in the study designs, sample sizes and treatment procedures may have influenced these different results.

It seems that lesion sterilization and tissue repair therapy (LSTR) with 3MIX is more appropriate for treatment of poor prognosis cases or cases for which mechanical instrumentation cannot be achieved due to physiologic root resorption Takushige et al.17

CONCLUSION

Based on the results of this study, it was concluded that 3 MIX is significantly more effective in the treatment of pulpally involved primary molars as compared to vitapex.

REFERENCES


CONTRIBUTIONS BY AUTHORS

1 Sadaf Qadeer: Performed all the procedure and made results and conclusions
2 Bader Munir: Supervised all the procedure and made an impact on discussion part
3 Saira Yousuf Dar: Introduction writing