Treatment of Infected Primary Teeth using Modified Antibiotic Paste

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Introduction

The first topical antibiotic introduced to endodontics was Grossman’s polyantibiotic paste in 1951, later many topical antibiotics have been introduced with varying combinations, few of those include Septomixine forte; PBSC (Combination of Penicillin, Bacitracin, Streptomycin and Caprylate sodium), and Clindamycin. However, none of these combinations has proven to be 100% successful in eliminating all the bacterial strains from the root canal system [1-5].

Materials and Methods

A child aged 7 years old with chronic infection related to the lower left primary molar came to our clinic for treatment of the infected molar (Figure 1). Treatment was explained to the parents and written informed consent was taken from parents before start of the study. A detailed medical history and previous illness with a history of drug allergy were taken from the parents, then the mentioned primary molar was diagnosed clinically, the molar was badly decayed with signs of chronic infection such as: gingival swelling and tenderness to percussion. A radiographic examination was done. The modified 3MIX-MP paste placed in the pulp chamber then temporary filling. The patient was recalled after 2 weeks. The tooth was obturated and restored then a stainless-steel crown placed. Then reevaluated at 3rd, 6th, and 12th months.

Results:

Excellent clinical and radiographic success when compared to conventional pulpectomy and non-instrumentational lesion sterilization tissue repair therapy.

Conclusion:

Treatment of Primary molar with modified 3MIX-MP, followed by instrumentation and obturation provided excellent clinical and radiographic success when compared to non-instrumentational lesion sterilization tissue repair therapy.

Keywords: Pulp infection; Pulpectomy; Modified antibiotic paste; Primary molars; Chronic, infected pulp; Modified 3 MIX-MP; Pulpectomy; Triple antibiotic paste; Primary teeth
before use, each powdered drug was divided in the proportion of 1:3:3 (one part of Ciprofloxacin, three parts of Metronidazole, and three parts of Doxycycline) and were mixed with propylene glycol and polyethylene glycol to form an ointment. Reddy GA et al. Trairatvorakul and Detsomboonrat, Jaya et al., Cruz et al. also followed the similar protocol of preparation of 3MIX antibiotic paste [8-11].

Results

Excellent clinical and radiographic success when compared to conventional pulpectomy and non-instrumentational lesion sterilization tissue repair therapy.

Discussion

This study was approved by “Research Ethics Committee, Taibah University, College of Dentistry, TU CD-REC”. The concept of Non-Instrumentation Endodontic Therapy introduced by Niigata university school of dentistry; Japan has gained reputation as it proved to attain 100% sterility in the root canal system [12-15]. They recommended a technique similar to pulpotomy where debriding only the pulp chamber of chronically infected primary teeth and placing medicament (ciprofloxacin, metronidazole, and minocycline) near the root orifice without preparing the radicular portion. Cruz et al. suggested vehicles such as macrogol and propylene glycol (3MIX–MP) and demonstrated that these vehicles will carry the medicament deep into the dentinal tubules, thus aid in effective eradication of bacteria [11]. Metronidazole (Nitroimidazole compound) due to its wide spectrum of antibacterial action against anaerobes (Ingham et al. 1975) gained importance as the 1st choice drug for triple antibiotic paste preparation [16,17]. Metronidazole binds to the DNA and disrupts its helical structure and thus leads to rapid cell death. However, metronidazole even at higher concentrations could not eradicate all the bacteria thus indicating the necessity of some additional drugs to sterilize these lesions [15]. The two other antibacterial drugs, i.e. ciprofloxacin, and minocycline, in addition to metronidazole (3MIX) were added in an effort to eliminate all bacteria [8,10,15,18]. The 2nd choice of drug ciprofloxacin is a synthetic fluoroquinolone with rapid bactericidal action. It inhibits the enzyme DNA gyrase of bacteria. It exhibits very potent activity against Gram-negative bacteria but very limited activity against Gram-positive bacteria. Most of the
anaerobic bacteria are resistant to ciprofloxacin. Hence, it is often combined with metronidazole in treating mixed infections. The 3rd choice of drug was minocycline. It is a semisynthetic derivative of tetracycline, primarily bacteriostatic, inhibiting protein synthesis by binding to 30S ribosomes in susceptible organisms and exhibits broad spectrum of activity against Gram-positive and Gram-negative microorganisms [3].

In our present study we replaced Minocycline with Doxycycline due to the difficulty in obtaining Minocycline, and before using the Doxycycline as a replacement we have done further searches for previous studies to ensure that both medications have the same effect and this replacement will not affect the efficacy of the mentioned mix. The already done studies concerning the difference between both Doxycycline and Minocycline revealed that still no statistically significant differences had been demonstrated in clinical trials when comparing Minocycline with Doxycycline, and investigators had concluded that both are equally effective. And they differ in their adverse event profile [19]. Considerably fewer adverse effects have been reported for Doxycycline than Minocycline; the adverse effects for Minocycline are 5 times more common than for Doxycycline [19]. We have followed the same protocol of Reddy GA et al. of extirpation of both necrotic coronal as well as all accessible radicular pulp tissue and then complete obturation, which is reported successful clinically over 16th month follow-up [9]. Although the previous studies have demonstrated that the LSTR (Lesion Sterilization Tissue Repair) technique as one of the successful techniques for management of chronically infected primary teeth, the controversies aroused about the duration of therapeutic activity of the medicament and leaving the infected material in the radicular region. So that the present study planned where in treated tooth were revisited after 2 weeks for medicament removal and obturation.

Conclusion

All the primary teeth with chronic infection which were treated using modified 3MIX-MP, followed by the instrumentation and obturation provided excellent clinical and radiographic success when compared to conventional pulpectomy and non-instrumentational lesion sterilization tissue repair therapy.

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