

Efficacy of Papacarie in Reduction Total Bacterial Count in Comparison with the Conventional Rotary Method

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ABSTRACT

Background: The change in the concepts of cavity preparation and the development of reliable adhesive materials lead to the development of alternative methods of caries removal. Chemo-mechanical caries removal (CMCR) involves the chemical softening of carious dentin, followed by its removal with manual excavation.

The present study was conducted to evaluate clinically the efficiency of caries removal using a new chemo-mechanical agent (Papacarie) compared to the conventional drilling method in reduction of total bacterial count.

Material and methods: The study is a split mouth design. The sample composes from sixty mandibular deciduous molars teeth in thirty children, between six to nine years of age with bilateral class I deep occlusal carious lesions without pulp involvement. Samples of this study were classified into group A and B with thirteen teeth for each. In group A treatment by Papacarie while group B were treated by the conventional drilling method

Results: The results showed significant different in total bacterial count in period after treatment with Papacarie as comparative with drill method for caries remove.

Conclusions: It was concluded that Papacarie could be an effective caries removal method to treat children, particularly those who present with early childhood caries or management problems.

Keywords: Chemo-mechanical caries removal, Papacarie, Dentin caries, Primary teeth. (J Bagh Coll Dentistry 2016; 28(4):141-143)

INTRODUCTION

Advances in the field of cariology and the philosophy of minimally invasive intervention have led to transformations in the restorative treatment of dental caries. The most striking change involves the selective removal of carious tissue and maximal preservation of healthy dental tissue. Traditional methods involving a drill and a bur are incompatible with this philosophy^(1,2).

The rotary method of caries removal is widely accepted, but it is often associated with long procedure, excessive cutting of uninfected dentin, pain, discomfort, noise, and fear. So, the quest for removal of caries with minimal pain and more tissue preservation has given rise to various alternative caries removal techniques. These include air abrasion, a traumatic restorative therapy, chemo-mechanical system, and lasers⁽³⁻⁶⁾.

Minimally invasive treatment has been increasingly employed in the management of dental caries, especially in young children⁽⁷⁻⁹⁾. Within the scope of this philosophy, the chemo-mechanical removal of carious tissue consists of the application of a natural or synthetic agent to dissolve the contaminated tissue and facilitate its removal with the aid of a traumatic mechanical force⁽¹⁰⁾.

Papacarie is a gel containing papain and chloramine that is used in combination with manual tools for the minimally invasive removal of carious tissue. This method eliminates the need for local anesthesia and the use of a bur, thereby

reducing the destruction caused to sound dental tissue⁽¹¹⁾.

The papain-based gel has bactericidal and bacteriostatic properties⁽¹²⁾ which may affect the number of microorganisms found in the dentin following the removal of carious tissue⁽¹³⁾.

The aim of the present study was to analyze the efficacy of Papacarie gel compared with the traditional method (TM) (low-speed bur) to remove caries and in reducing the total bacterial count.

MATERIALS AND METHODS

This study is a (split mouth) design. Samples of this study were classified into group A and B with thirty teeth for each where two methods of caries removal were compared for the same patient in the same visit.

Ethical aspects and subject selection

Parents or legal guardians received detailed information on the study and signed a statement of informed consent, permitting the participation of their children. Children seeking treatment at the specialist Healthy dental paediatric centre in Al-Alwayia healthy centre was submitted to initial clinical examinations.

The selection criteria were as follows: an absence of systemic illness, adequate behavior, and caries in the dentin of bilateral two deciduous molar with class I occlusal carious lesions without pulp involvement according to criteria described by Muhlemann et al.⁽¹⁴⁾. Following the application of these criteria, the sample included

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60 deciduous teeth in 30 children (2 teeth per child) aged 6 -9 years old.

Clinical procedure

A split-mouth design was performed to compare the efficacy of Papacarie® gel (Fórmula &Ac, ão, São Paulo, SP, Brazil) and the traditional caries removal method (low-speed bur). For each individual, one tooth was randomly selected for one treatment and the other tooth automatically received the other form of treatment.

Group 1 = chemo-mechanical removal with Papacarie

Group 2= traditional caries removal with a low-speed bur.

Group I: Using the chemo-mechanical method

The Papacarie was taken out of the refrigerator ten minutes before treatment to reach room temperature. Application of rubber dam on selected tooth and the carious cavity was filled with Papacarie. The gel was allowed to work for 40- 60 seconds.

The softened decayed dentin was scraped away with a blunt excavator in a pendulum movement according to Manufactory instruction. The softened tissue was scraped away but not cut within. The gel was reapplied when necessary and when present unsupported enamel remove when remove undermine carious dentine.

Cavity was examined by visual inspection and tactile sensation using a mirror and an explorer to assess caries removal (15). Caries was considered removed when the explorer did not stick in dentin and did not give a tug-back sensation.

Group II: Using conventional drilling method

After admiration of local anesthesia caries was removed using a low speed hand piece with size 8 round burs. The cavities were checked for remaining caries using the same criteria used for the chemo-mechanical caries removal. After caries removal by either method, cavities were restored using composite resin according to the manufacturer’s instructions (16).

Assessment producers

For each technique all these samplescollected before and after caries remove by spoon excavator in same amount, transported to the microbiological investigation laboratory by place in flask containing transported media. Transported media dilated in about 3 ml of normal saline for each transported media.

Each 1ml boarded in petri- dish with nutrient agar by using glass disposable pipette according to poured plate culturing method after that place

in incubator at 35C for 2 days and compares the result by collected number of colony formed in dish (17).

RESULTS

Table (1) and figure (1) show the descriptive statistic (mean of score and standard deviation) and inferential statistic of bacteriological investigation count at period before and after treatment. Mean of bacterial count for papcaire before treatment was (4300.33) and for conventional treatment was (4425.67).while mean after treatment with papacaire was (285.33) and for conventional treatment was (411.33).

Table 2 represents statistically significant difference 0.027(P<0.05) in total bacterial count between papacarie treatment and conventional treatment group in period after treatment, that means Papacarie produce reduction in total bacterial count after treatments in comparison with conventional method.

Table 1: Descriptive statistic to the bacterial count for Papcarie and conventional method before and after treatment

Bact. Investigation	Papacaire			Conventional	
	No.	Mean	S.D.	Mean	S.D.
Before	30	4300.33	2307.3	4425.67	1852
After	30	285.33	196.4	411.33	232.20

Table 2: Summary statistics of bacteriological investigation at pre and post periods of times in each treatment with comparisons significant

Treatment	Bact. Investigation	No.	t-test	d.f.	Sig. (*)
Before	Papcaire	30	-0.232	58	0.817 NS
	Conventional	30			
After	Papcaire	30	2.269	58	0.027 S
	Conventional	30			

(*)S: Sig. at P<0.05; NS: Non sig. The Statistical Hypotheses are based on two independent samples t-test.

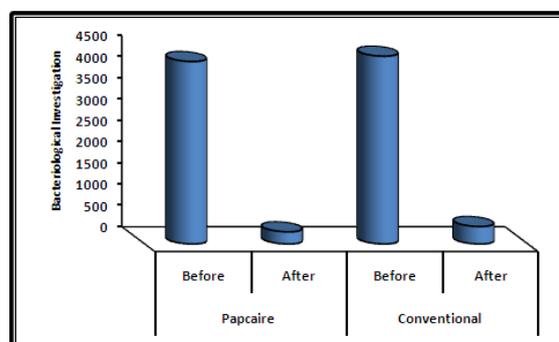


Figure 1: Bar Chart of bacteriological investigation count for studied groups before and after treatment

DISCUSSION

Chemo-mechanical caries removal methods have an antimicrobial effect; by acting directly on the bacteria, they promote bacterial destruction and consequently remove the etiologic agent. The reduction in bacteria with the use of the papain-based gel may be related to the bactericidal and bacteriostatic action of the gel, which results in the inhibition of gram-negative and gram-positive bacteria⁽¹⁸⁾.

Result of this study that reported the comparison of total bacterial count for each treatment group in two periods assigned a decrease in bacterial count after treatment of each group.

A significant difference that represent papacarie treatment group more effective in reduction of total bacterial count when compare with conventional method

Based on the findings of the present study, Papacarie is an excellent option for the minimally invasive removal of carious tissue, achieving significant reductions in total bacteria, over that observed in the traditional caries removal method, with offering the advantage of less destructive effects on sound dental tissue. This result in agreement with reduction in microorganisms described in previous studies⁽¹⁹⁻²¹⁾

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