

Original Research

Assessment of antimicrobial efficacy of aqueous ozone, green tea, and normal saline as irrigants in pulpectomy procedures of primary teeth

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ABSTRACT:

Background: The main etiologic cause in the development of root canal infections is widely acknowledged to be bacteria. The present study was conducted to assess antimicrobial efficacy of aqueous ozone, green tea, and normal saline as irrigants in pulpectomy procedures of primary teeth. **Materials & Methods:** 54 children with single-rooted deciduous tooth indicated for pulpectomy of both genders were divided into 3 groups of 28 each. Group I was normal saline (0.9 g/100 ml) (control group), group II- Ozonated water (20 mg/l) and group III was green tea (25 mg/50 ml of water). In all teeth, pulpectomy was performed. Specimens for anaerobic culture were collected three times from the teeth: before irrigation, after initial irrigation, and on the 3rd day after final irrigation. **Results:** Group I had 14 males and 14 females, group II had 12 males and 16 females and group III had 15 males and 13 females. The mean CFUs pre- irrigation, after irrigation and after final irrigation on 3rd day in group I was 174.2, 125.2 and 62.4, in group II was 176.4, 132.6 and 60.8 and in group III was 174.2, 65.4 and 17.4 respectively. The difference was significant (P < 0.05). **Conclusion:** In the primary teeth, ozonated water and green tea could both be recommended as effective substitutes for traditional root canal irrigants.

Key words: primary teeth, ozonated water, green tea

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INTRODUCTION

The main etiologic cause in the development of root canal infections is widely acknowledged to be bacteria. Up until 1970, Viridans Streptococci (alpha-hemolytic streptococci) were the most prevalent bacterial species recovered from the root canals of permanent teeth.¹ However, anaerobic microorganisms made up over 70% of the microbiota in the root canals of the primary molars that had been unsuccessfully treated, according to studies on the root canal microbiota of primary teeth.² These microorganisms were most common in the root canals of primary teeth with necrotic pulp and periapical lesions. Additionally, the majority of the germs in primary

teeth that need to be extracted are anaerobic microbes.³

The need for endodontic therapy arises from the rapid progression of caries in primary teeth and the ensuing pulpal damage caused by bacteria and the toxins they produce that pollute the tissue.⁴ The development of the permanent tooth germ is located extremely near to the roots of the primary teeth, and the large medullary bone gaps encourage the spread of infection. The foundation of endodontic caries therapy has traditionally been considered instrumentation.⁵ However, the structural complexity of the primary teeth's root canal system, which includes dentinal tubules, auxiliary canals, and root tip bifurcation,

prevents it from being cleaned thoroughly with only pure instruments.⁶The present study was conducted to assess antimicrobial efficacy of aqueous ozone, green tea, and normal saline as irrigants in pulpectomy procedures of primary teeth.

MATERIALS & METHODS

The present study consisted of 54 children with single-rooted deciduous tooth indicated for pulpectomy of both genders. Parents gave their written consent to participate in the study.

Data such as name, age, gender etc. was recorded. Patients were divided into 3 groups of 28 each. Group I was normal saline (0.9 g/100 ml) (control group), group II- Ozonated water (20 mg/l) and group III was green tea (25 mg/50 ml of water). In all teeth, pulpectomy was performed. Specimens for anaerobic culture were collected three times from the teeth: before irrigation, after initial irrigation, and on the 3rd day after final irrigation. Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

RESULTS

Table I Distribution of patients

Groups	Group I	Group II	Group III
Method	Normal saline	Ozonated water	Green tea
M:F	14:14	12:16	15:13

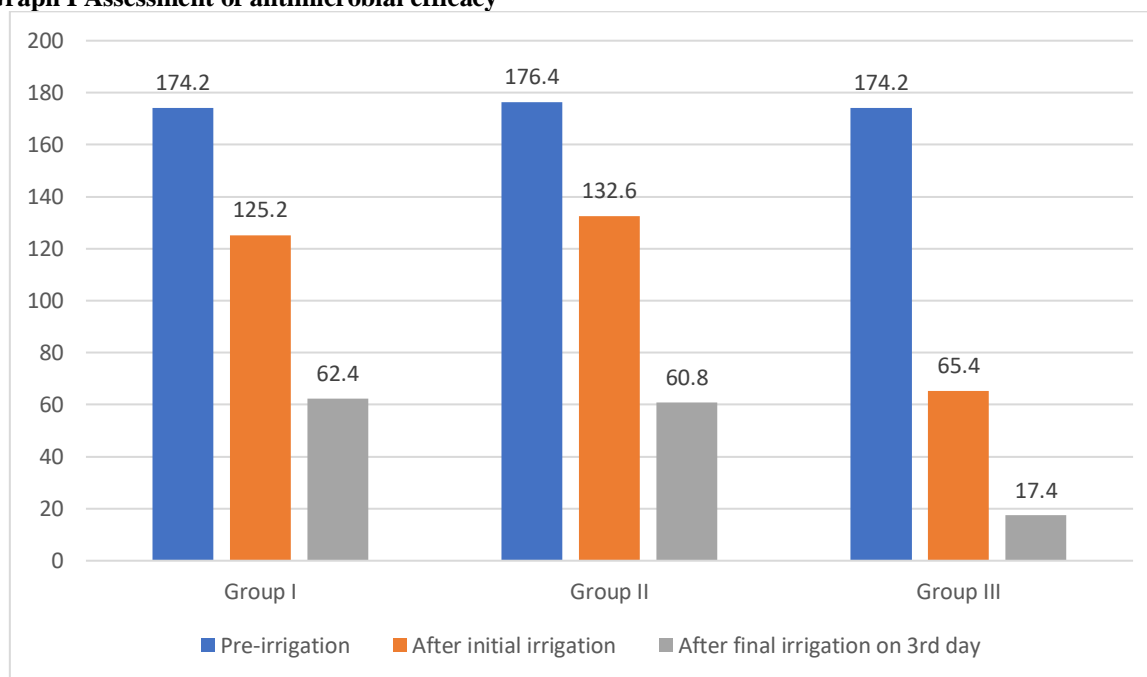
Table I shows that group I had 14 males and 14 females, group II had 12 males and 16 females and group III had 15 males and 13 females.

Table II Assessment of antimicrobial efficacy

Groups	Pre-irrigation	After initial irrigation	After final irrigation on 3rd day	P value
Group I	174.2	125.2	62.4	0.02
Group II	176.4	132.6	60.8	0.05
Group III	174.2	65.4	17.4	0.01

Table II, graph I shows that mean CFUs pre- irrigation, after irrigation and after final irrigation on 3rd day in group I was 174.2, 125.2 and 62.4, in group II was 176.4, 132.6 and 60.8 and in group III was 174.2, 65.4 and 17.4 respectively. The difference was significant (P< 0.05).

Graph I Assessment of antimicrobial efficacy



DISCUSSION

It is well known that green tea has excellent therapeutic benefits. Additionally, it has been noted that green tea has a particular antibacterial impact on *Enterococcus faecalis*.⁷ Green tea polyphenols' ability to act as antioxidants is strongly correlated with the mix of aromatic rings and hydroxyl groups that make

up their structure.⁸ The hydroxyl groups bind to and neutralise free radicals, which causes the bacterial cell wall to be destroyed and dissolve, which has an antibacterial effect.⁹The present study was conducted to assess antimicrobial efficacy of aqueous ozone, green tea, and normal saline as irrigants in pulpectomy procedures of primary teeth.

We found that group I had 14 males and 14 females, group II had 12 males and 16 females and group III had 15 males and 13 females. Panchal et al¹⁰ evaluated the antimicrobial effect of sodium hypochlorite (NaOCl), Triphala, Eucalyptus, and carvacrol on *Enterococcus faecalis* as the most common microorganism isolated from infected root canals. Seventy-five mandibular premolar teeth were randomly distributed into five study groups: 5.25% NaOCl, 10% Triphala, 1.25% Eucalyptus, 0.6% carvacrol, and negative control (saline) group. Samples were taken using paper points from the canal spaces and using Gates–Glidden (GG) drills from dentinal tubules; after sample culturing, the colony forming unit (CFU) were counted. All irrigants have shown a reduction of microorganisms in the root canal space. After the use of NaOCl and Eucalyptus, the bacterial count was significantly reduced in the canal, as well as dentin sampling, as compared to Triphala and carvacrol. The antimicrobial efficiency of all irrigants against *E. faecalis* revealed a significant difference ($p < 0.05$).

We found that mean CFUs pre- irrigation, after irrigation and after final irrigation on 3rd day in group I was 174.2, 125.2 and 62.4, in group II was 176.4, 132.6 and 60.8 and in group III was 174.2, 65.4 and 17.4 respectively. Agarwal et al¹¹ in their study, 60 patients between 4 and 8 years of age with a single-rooted deciduous tooth indicated for pulpectomy were included. The infected teeth were randomly allocated to one of the three treatment groups based on the irrigating agents used, namely normal saline, green tea extract, or ozonated water. Specimens for anaerobic culture were collected three times from the teeth: before irrigation, after initial irrigation, and on the 3rd day after final irrigation. Mean colony forming unit (CFU) count after both initial and final irrigation with ozonated water was significantly lower when compared with green tea and normal saline. Further, it was observed that the mean CFU count with green tea was significantly lower than the counts obtained with normal saline on the 3rd day after final irrigation.

Bhargava et al¹² evaluated the antimicrobial efficacy of Neem, Green Tea, Triphala and sodium hypochlorite against the endodontic microflora. Mixed cultures of bacteria were isolated from patients, with carious teeth and associated with periapical radiolucencies. A paper point was inserted into the canal to obtain a sample of a mixed culture of micro- organisms. These paper points were cultured and agar diffusion test was done for the different irrigants. The irrigants were divided into Group I:

Neem (60mg/ml in 10% DMSO), Group II: Green Tea Polyphenols (60mg/ml in 10% DMSO), Group III: Triphala (60 mg/ml in 10% DMSO), Group IV: 3% NaOCl, Group V: Sterile saline. Sodium hypochlorite showed the maximum antimicrobial activity, followed by Neem. There was no statistical difference between the activity of sodium hypochlorite and Neem. This was followed by Triphala and Green Tea, respectively.

The limitation the study is small sample size.

CONCLUSION

Authors found that

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