

Original Research Article

Effectiveness of Hydrogen Peroxide as a sub gingival irrigant - A clinical study

**Tahira Ashraf^{1*}, Suhail Majid Jan², Roobal Behal³, Rafiya Nazir⁴,
Abhima Kumar⁵**

¹MDS, Department of Periodontics, GDC, Srinagar

²Professor and HOD, Department of Periodontics, GDC, Srinagar

³Associate Professor, Department of Periodontics, GDC, Srinagar

⁴MDS, Department of Periodontics, GDC, Srinagar

⁵MDS, Department of Periodontics, GDC, Srinagar

*Corresponding author email: tahiraashraf133@gmail.com

	International Archives of Integrated Medicine, Vol. 4, Issue 11, November, 2017. Copy right © 2017, IAIM, All Rights Reserved. Available online at http://iaimjournal.com/ ISSN: 2394-0026 (P) ISSN: 2394-0034 (O)
Received on: 30-10-2017 Source of support: Nil	Accepted on: 05-11-2017 Conflict of interest: None declared.
How to cite this article: Tahira Ashraf, Suhail Majid Jan, Roobal Behal, Rafiya Nazir, Abhima Kumar. Effectiveness of Hydrogen Peroxide as a sub gingival irrigant - A clinical study. IAIM, 2017; 4(11): 177-181.	

Abstract

Introduction: Periodontitis a chronic inflammatory disease results in the destruction of tooth supporting tissues, eventually progresses to tooth loss. Non-surgical periodontal therapy in form of scaling and root planning although considered as a gold standard, does not completely eradicate periodontal pathogens. Limitation of access and bacterial invasion of periodontal tissues being the main reason and hence the demand for an adjunctive measure is necessitated. Sub gingival irrigation interferes with various plaque components predominantly anaerobic bacterial flora which is known to initiate and perpetuate periodontal destruction. The aim of this study is to investigate the effect of sub gingival irrigation with 3% H₂O₂ compared to normal saline.

Material and methods: 20 patients were taken for the study. After scaling and root planing, quadrants in each patient's mouth were randomly treated two with 20 ml 3% H₂O₂ sub gingival irrigation and the other two with normal saline. Sub gingival irrigation was performed at baseline and after 1 and 2 weeks. The clinical parameters were recorded at baseline at the end of week 3 and at the end of week 5.

Results: Results showed that sub gingival irrigation with 3% H₂O₂ produced a significant reduction in gingival bleeding, pocket depths and a significant gain in clinical attachment level compared to the control.

Conclusion: The results of the present study conclude that that sub gingival irrigation with 3% H₂O₂ results in inflammation control manifested as decreased gingival bleeding, reduction in pocket depth and gain in relative attachment levels.

Key words

Periodontitis, Hydrogen peroxide, Normal saline.

Introduction

Periodontitis is a major health issue in different populations since ages [1] and bacterial plaque is considered as the main etiological factor in its pathogenesis. Treatment of periodontitis is based on destroying the bacterial plaque [2]. Scaling and root planing (SRP), the gold standard in the treatment of periodontal diseases, does not completely debride sub gingival plaque and calculus thus complete eradication of periodontal pathogens does not take place [3] showing variable results. Difficulty in gaining access to deep pockets and bacterial invasion of periodontal tissues accounts for the variable results necessitating the use of local or systemic antimicrobial agents [4]. Chlorhexidine, the most potent and most commonly used agent has unfavourable side effects, which demands the need for alternative agents [5]. Hydrogen peroxide alone or in combination with salts has been used as an effective sub gingival irrigant since years ago. H₂O₂ levels above 1% shows a wide spectrum of antimicrobial activity against bacteria, yeasts, fungi, viruses and spores [6]. Considering the fact that periodontitis is predominated by anaerobic bacteria and the destructive effects of free oxygen radicals of H₂O₂ [7], Pocket irrigation with 3% H₂O₂ has been widely used as a sub gingival irrigant. This clinical study is sought to investigate the effect of sub gingival irrigation with H₂O₂ compared to normal saline.

Materials and methods

Twenty patients who had been referred to the Department of Periodontics, Govt. Dental College and Hospital Srinagar, were enrolled in this study after signing consent forms and fulfilling the inclusion and exclusion criteria.

Inclusion criteria

- Mild to moderate chronic periodontitis with pocket depths of 3–5 mm

Exclusion criteria

- Any systematic diseases such as diabetes, blood pressure, and hematologic, cardiovascular or renal disorders.
- Patient has used antibiotics or any kind of mouth rinses in the previous 3 months.

Following clinical indices of patients were recorded at baseline, 3 weeks and 5 weeks

- Relative attachment level (Relative distance between the base of a pocket and a fixed reference point (horizontal notch) on the stent) [8]
- Pocket depth (by William's probe)
- And gingival bleeding (Ainano and Bay's method).

For gingival sulcus bleeding, the probe is gently moved through the margins around a tooth; after 10 seconds presence or absence of bleeding is evaluated.

The first phase of treatment, consisting of OHI and full-mouth Scaling and root planing (SRP), was performed on each patient and was carried out using a using magnetostrictive scaler. Two quadrants in each patient's mouth were randomly treated with 20 ml 3% H₂O₂ sub gingival irrigation and the other two quadrants with normal saline. Sub gingival irrigation was performed at baseline and after 1 and 2 weeks. The clinical parameters were recorded at baseline at the end of week 3 and at the end of week 5. The recorded data was compiled and entered in a spread sheet (Microsoft Excel) and then

exported to data editor of SPSS Version 20.0 (SPSS Inc., Chicago, Illinois, USA). Data was expressed as Mean \pm SD. Student's independent t-test was employed for intergroup comparison of various periodontal parameters and for intra-group comparison; paired t-test was applied. A P-value of less than 0.05 was considered statistically significant. All P-values were two tailed.

Results

According to the results of this study, the mean difference between periodontal parameters (Gingival bleeding index, Pocket depth and Relative attachment level) of two groups that is Hydrogen peroxide group; Group A and Normal saline group; Group B at baseline is statistically non-significant (**Table - 1**).

Table - 1: Comparison based on gingival bleeding index (GBI), pocket depth (PD) and relative attachment levels (RAL) at baseline among two groups.

Parameter	Group 1		Group 2		P-value [@]
	Mean	SD	Mean	SD	
GBI	29.0	2.49	29.3	2.50	0.791
PD	3.3	0.82	3.8	0.63	0.145
RAL	9.9	0.99	10.3	1.25	0.439

Table - 2: Intra-group comparison of various periodontal parameters at 3 and 5 weeks in Group 1.

Periodontal Parameter		Mean	SD	P-value
GBI	Baseline	29.0	2.49	-
	3 Weeks	7.2	1.48	<0.001*
	5 Weeks	6.8	1.23	<0.001*
PD	Baseline	3.3	0.82	-
	3 Weeks	2.4	0.69	0.002*
	5 Weeks	2.2	0.42	<0.001*
RAL	Baseline	9.9	0.99	-
	3 Weeks	10.6	1.27	0.009*
	5 Weeks	10.8	1.03	<0.001*

Table - 3: Intra-group comparison of various periodontal parameters at 3 and 5 weeks in Group 2.

		Mean	SD	P-value
GBI	Baseline	29.3	2.50	-
	3 Week	18.5	2.84	<0.001*
	5 Weeks	27.2	2.01	0.064
PD	Baseline	3.7	0.82	-
	3 Week	3.2	0.79	0.183
	5 Weeks	3.0	0.67	0.051
RAL	Baseline	10.3	1.25	-
	3 Week	10.5	1.35	0.736
	5 Weeks	10.6	1.35	0.613

In Hydrogen peroxide group; Group A, Comparison of mean gingival bleeding, mean probing depths and mean relative attachment level before and after treatment (at baseline (0), 3

weeks and 5 weeks after treatment), shows a statistically significant difference ($P<0.05$) (**Table - 2**).

In Normal saline group; Group B, a significant decrease in mean gingival bleeding from baseline to 3rd week after which it increased giving a statistically insignificant value when comparing baseline and 5th week values (**Table - 3**).

A statistically insignificant difference was observed in values of mean probing depths and mean relative attachment levels in Group B when comparing baseline values with values at 3rd and 5th week (**Table - 3**).

Discussion

This study was conducted to evaluate the clinical effect of sub gingival irrigation with 20 mL of 3% H₂O₂ compared to normal saline. According to the results, there was a significant reduction in gingival bleeding from baseline to 3rd and 5th week in Hydrogen peroxide group; Group A when compared to Normal saline group; Group B reaching from 29.0±2.49 to 6.8 ±1.23 in the H₂O₂ group but from 29.3±2.50 to 27.2±2.01 in normal saline group which is consistent with the results of the study carried out by Morad, et al. [9] according to which, 3% H₂O₂ had a significant effect on probing depth compared to the normal saline group.

In the H₂O₂ group, mean probing depth changed from 3.3±0.82 to 2.4 ±0.69 mm at 3rd week to 2.2 ±0.42 at 5th week and in the normal saline group it decreased from 3.7±0.82 mm to 3.2 ±0.79 mm at 3rd week to 3.0 ±0.67 at 5th week. The results of our study are in accordance with Wolff's study [10] where 3% H₂O₂ had a positive effect on pocket depth reduction. According to Wolff, et al. [11] an oxidizing agent containing H₂O₂ had a positive effect on probing depth. The oxidising nature of H₂O₂ results in destruction of anaerobic periodontal pathogens which account for the majority of inflammatory process of periodontium. The reduction in inflammatory exudates and attachment gain might be responsible for gain in probing depth.

In 3% H₂O₂ group, the mean relative attachment levels showed a statistically significant gain from

baseline to 3rd week and 5th week. Gain in attachment level, reached from 9.9±0.99 at baseline to 10.6±1.27 at 3rd week to 10.8±1.03 mm at 5th week. In the normal saline group mean relative attachment levels increased from 10.3±1.25 at baseline to 10.5±1.35 at 3rd week to 10.6±1.35 mm at 5th week. Although there was a gain in mean relative attachment levels the values were statistically insignificant. The results of our study is in accordance with the studies conducted by Wolff, et al. [10] and Moradi, et al. [9] which also showed that H₂O₂ was more effective in attachment gain. Attachment gain in the H₂O₂ group was faster and more than normal saline group. Changes in attachment level are a result of building an attachment, which corresponds to the amount of periodontal destruction.

Hence to conclude, sub gingival irrigation with 3% H₂O₂ is effective in reducing gingival bleeding and inflammation and also results in attachment gain thus showing a positive clinical effect compared to sub gingival irrigation with normal saline.

References

1. Pihlstrom BL, Michalowicz BS, Johnson NW. Periodontal diseases. Lancet, 2005; 366: 1809–20.
2. Newman MG, Takei HH, Carranza FA. Carranza's Clinical Periodontology: WB Saunders Co. Philadelphia: USA, 2002, p. 96–100.
3. Albandar JM, Brunelle JA, Kingman A. Destructive periodontal disease in adults 30 years of age and older in the United States. J periodontal., 1999; 70(1): 13–29.
4. Adriaens PA, Edwards CA, De Boever JA, Loesche WJ. Ultra structural observations on bacterial invasion in cementum and radicular dentin of periodontally diseased human teeth. J Periodontol., 1988; 59: 493-503.
5. Loesche WJ. The antimicrobial treatment of periodontal disease: Changing the

- treatment paradigm. *Crit Rev Oral Biol Med.*, 1999; 10: 245-275.
6. Glockmann E, Wiesner J, Oehring H, Glockmann I. Antibacterial efficiency and toxicity of hydrogen peroxide and other antiseptics. *Dtsch Stomatol.*, 1990; 40(11): 462– 3.
 7. Sahebjam Atabaki, M. Moradi Haghgoo, J, Khoshhal, M. Arabi, R. Khodadoostan, A. Gholami, L. Clinical effect of periodontal pocket irrigation with H_2O_2 . *DJH*, 2011; 3: 53- 59.
 8. Fleming Isidor, Thorkild Karring, Rolf Attstrom. Reproducibility of pocket depth and attachment level measurements when using a flexible splint. *J Clin Periodontol.*, 1984; 11: 662-8.
 9. Sahebjam Atabaki, M. Moradi Haghgoo, J. Khoshhal, M. Arabi, R. Khodadoostan, A, Gholami, L. Clinical Effect of Periodontal Pocket Irrigation with H_2O_2 . *DJH*, 2011; 3: 1.
 10. Wolff LF, Bandt C, Pihlstrom B, Brayer L. Phase contrast microscopic evaluation of sub gingival plaque in combination with either conventional or antimicrobial home treatment of patients with periodontal inflammation. *J Periodontal Res.*, 1982 Sep; 17(5): 537–40.
 11. Wolff LF, Pihlstrom BL, Bakdash MB, Schaffer EM, Aepli DM, Bandt CL. Four-year investigation of salt and peroxide regimen compared with conventional oral hygiene. *J Am Dent Assoc.*, 1989 Jan; 118(1): 67–72.