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ASSESSMENT OF CLINICAL AND MICROBIOLOGICAL CHANGES IN PATIENTS WITH CHRONIC PERIODONTITIS TREATED WITH SCALING AND ROOT PLANING (SRP) ALONE AND SCALING AND ROOT PLANING (SRP) WITH BLUE-M GEL: A SPLIT-MOUTH RANDOMIZED CLINICAL TRIAL

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ABSTRACT

Introduction: Blue-m oral gel is specially recently developed formula by dentists for specific targeted problems in the mouth and is claimed to possess unique properties when compare to convention local drug delivery systems. **Objective:** The objective of the present study was to compare and evaluate the efficacy of Blue-m gel as an adjunct to (SRP) in ≤ 5mm periodontal pockets, with regard to its clinical effectiveness and bactericidal properties. **Methodology:** 10 systemically healthy patients with pocket depth ≤ 5mm were selected to whom SRP was performed. At baseline PD, GI, PI & BOP were measured & quadrants were divided into in group I-(control group) –SRP only in group II-(experimental group)– SRP with blue-m gel, gel was applied to experimental group at baseline, Parameters were re-evaluated after 1 month. **Result:** Statistically significant reduction in PI, GI & Microbial count was seen after 1 month in experimental group. **Conclusions:** Subgingival application of Blue-M gel following SRP is beneficial in reducing microbial count in moderate to deep periodontal pockets.

INTRODUCTION

Blue-m oral gel formula is developed by a man on mission namely Peter Blijdrop & Fokke Jan Mideendrop in Holland; NL, Europe (2010) for specific problems in the mouth.Blue-m oral gel is designed to be safe and effective in restoring normal levels of oxygen in those places of the oral cavity where it might be decreased pockets, bleeding gums, wounds, which can be results from extraction, implantation, chemotherapy or false teeth. This provides a first class solution from the dental clinic to people suffering from severe oral problems.

Advantages of using blue-m oral gel

- Fast and effective
- High concentration of active oxygen
- Speeds up the healing process of bleeding gums
- Reduces pockets around teeth and implants
- Speeds up the healing of wounds in general
- Normalises and controls harmful bacteria

Composition

- Aqua
- Alcohol
- Glycerin
- Silica
- Sodium Saccharin
- Sodium Perborate
- Citric Acid
- PEG-32
- Sodium Gluconate
- Lactoferrin
- Xanthan Gum
- Cellulose Gum with their specific functions.

Aim

- The aim of this study was to assess in reducing clinical and microbial count within moderate to deep periodontal pockets in patients with chronic periodontitis treated with Scaling and root planing (SRP) alone and Scaling and root planing (SRP) with Blue-M Gel.

Exclusion and Inclusion criteria:

Inclusion criteria	Exclusion criteria
Age group of 20–50 years	Systemically compromised patient
Both sexes were included	Pregnant and lactating mothers

Patients with Chronic periodontitis	Deleterious habits such as: Smoking, Alcohol consumption, Gutka and Tobacco chewers
Probing pocket depth less than or equal to 5mm (<5 mm)	Use of antibiotics within 6months prior to the study
Gingival index (GI)	Active periodontal treatment within last 6 months
Plaque index (PI)	

MATERIALS AND METHOD

The present study was designed as a randomized, clinical trial with one control and one experimental group.

The quadrants were divided into two groups i.e. **Experimental group** received (Blue-M gel) (Europe Groteweg, 111, 8191 JV; Wapenveld, Netherland)

Control group received (SRP Only)

- Mouth Mirror
- UNC-15 Graduated Periodontal Probe
- Ultrasonic Scaler (Woodpecker, India)
- Disposable syringe

Fig. 1: Blue-M Gel.

Method

After an appropriate evaluation and obtaining permission from Ethical Committee of the Institution, collection of the data was carried out as follows.

Written informed consent was taken from all 10 patients.

The following clinical parameters were recorded:

- Gingival Index (GI)
- Plaque Index (PI)
- Bleeding and probing (BOP) recorded at baseline.
- The probing pocket depth measured using a UNC-15 graduated periodontal probe.

Randomization

After baseline examination, 1quadrant was assigned to one of the following treatment modalities:

- **In Group I-(Control Group) –SRP only**
- **In Group II-(Experimental Group) – SRP with Blue-M Gel**

Periodontal treatment

10 Patients with pocket depth <5 mm were selected from systemically healthy patients to whom SRP was performed & oral hygiene instructions were given.

Before treatment PD, GI, PI, BOP measured & plaque sample were collected & quadrants were divided into two group

In Group I (Control Group) SRP was performed

In Group II (Experimental Group) SRP done using ultrasonic scaler & the area of interest was completely dried using air syringe, and then the isolation of the desired site was done with the help of cotton rolls that were made with the intention to prevent contamination from saliva.

The local drug delivery consisting of Blue-m gel was introduced into the periodontal pockets by means of a disposable syringe with a needle attached to it giving it a 90 degree bend so as to properly place the gel in position.

The pocket opening filled with the respective gel then covered by Coe-Pak to retain the gel in the periodontal pocket, as well as to prevent the entry of oral fluids of the oral cavity.

The compared sites then checked for all the clinical parameters after a 1 month.

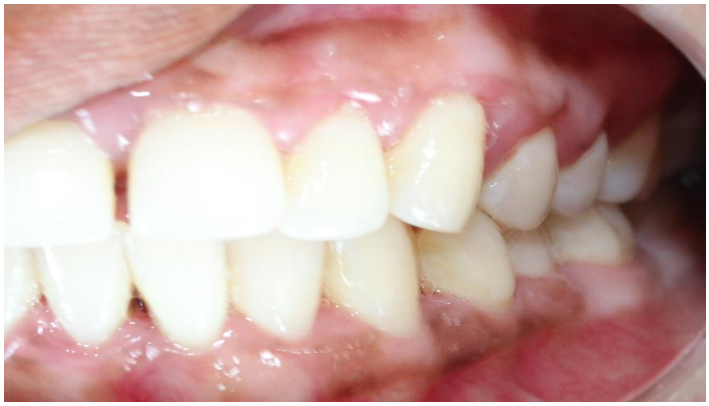


Fig. 2: Pre-operative before Blue-M gel application.

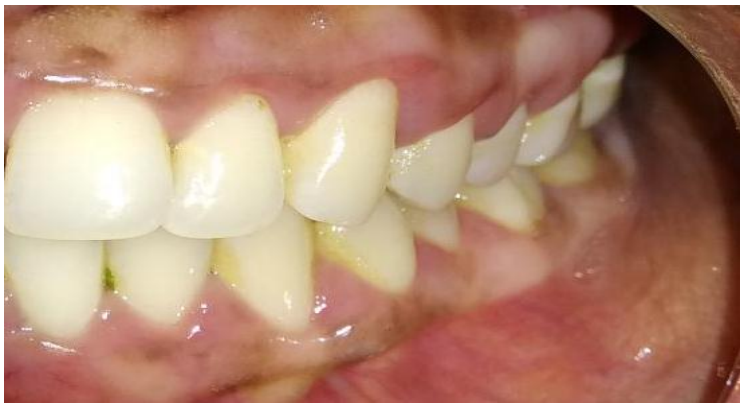


Fig. 3: Post-op after Blue-M gel application.

Microbiological analysis

The subgingival plaque samples was collected & carried out to standardize the sampling procedure and to avoid any bias.

Samples consisting of plaque were collected and scrapped from selected quadrants and was pooled in "blood agar" for microbiological analysis.

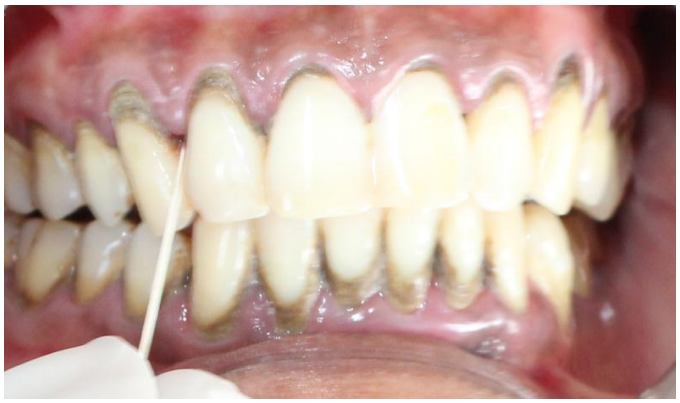


Fig. 4: Plaque sample collected.

Immediately after taking the samples, they were transferred for microbiological analysis of *aerobic bacteria* which had to be separately inoculated or grown in aerobic jar to meet the requirement for culturing and quantification of anaerobic bacteria.

Total bacterial count was assessed at baseline and at 1 month.

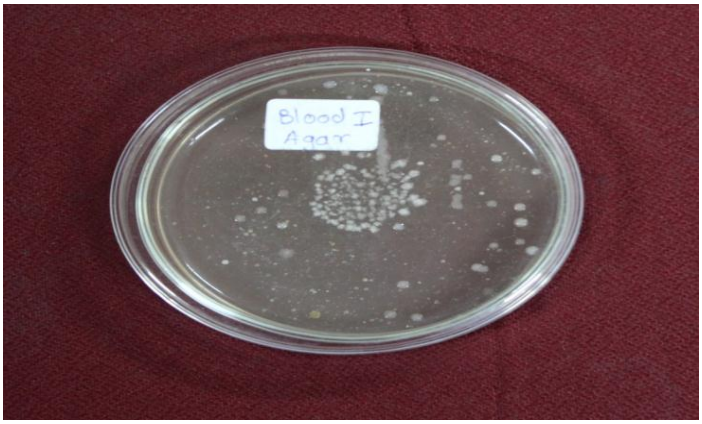


Fig. 2: Microbial Culture before Treatment in Group II i.e Experimental Group.

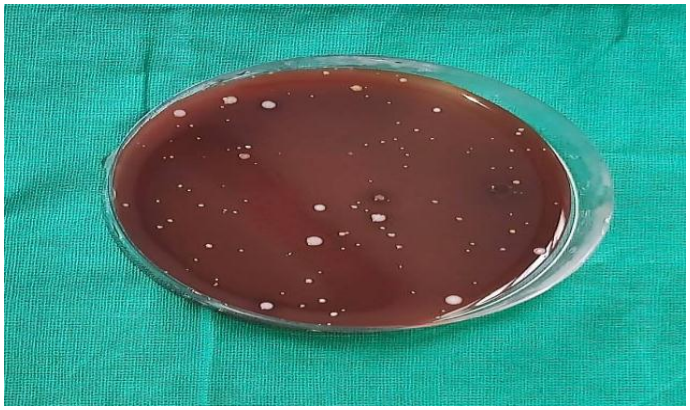


Fig. 3: Microbial Culture after treatment in Group II i.e Experimental Group.

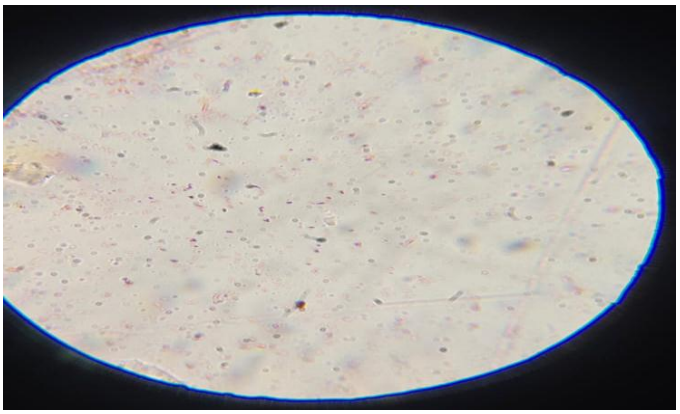


Fig. 4: Reduction in rods and cocci after application of "BLUE-M" Gel in experimental Group II.

Statistical analysis

All the data were entered into Microsoft Excel 2010.

Descriptive statistics were expressed as **mean ± standard deviation (SD)** for each group for each indices.

Two groups were compared by **Unpaired't' test** at various time interval.

Simple/Multiple bar chart were used for graphical representation

All the above test 'p' value was considered statistically significant when it was**<0.05**.

The software used was SPSS (Statistical Package for Social Sciences) version 19.

RESULTS

At baseline, there was no statistical difference between the control and Experimental groups in any of investigated parameters.

Independent *t* test showed statistical significance in the reduction of PI, GI, BOP and PD after 1month

Both the Experimental and control groups showed a significant reduction in PI, GI, BOP and PD.

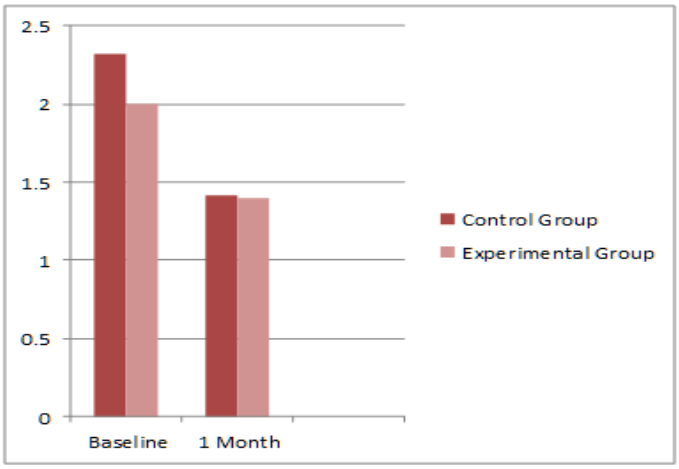
Experimental group showed a significant reduction in total bacterial count after 1 month

The reduction in PI, GI and BOP was greater in the Experimental group than for the control group.

Table 1: Comparison of PI between two groups at two interval time by Independent 't' test.

Plaque Index	Baseline	1 Month
Control group	2.32 ±.18	1.420± 0.47
Experimental Group	2.00 ±0.19	1.40±0.55
Independent 't' test. (p value)	0.004*	0.952

There was statistically significant difference for plaque index at baseline (p=0.004) and after 1 months interval with (p=0.952)

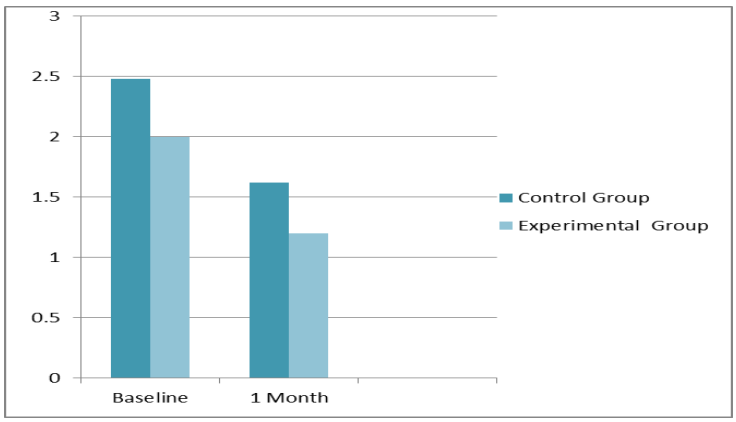


Graph 1: Comparison of PI between two groups at two interval time by Independent't' test.

Table 2: Comparison of GI between two groups at two interval time by Independent 't' test.

Gingival Index	Baseline	1 Month
Control group	2.48 ±.24	1.620± 0.426
Experimental Group	2.00 ±0.32	1.200±0.48
Independent 't' test. (p value)	0.002*	0.167

There was statistically significant difference for gingival index at baseline (p=0.002) and after 1 months interval with p=0.167.

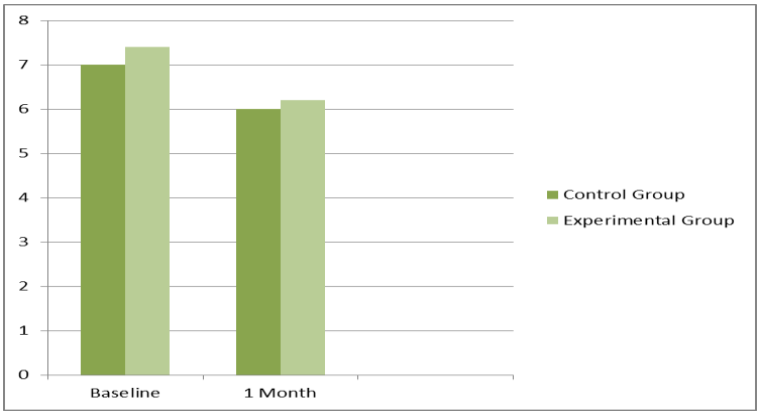


Graph 2: Comparison of GI between two groups at two interval time by Independent 't' test.

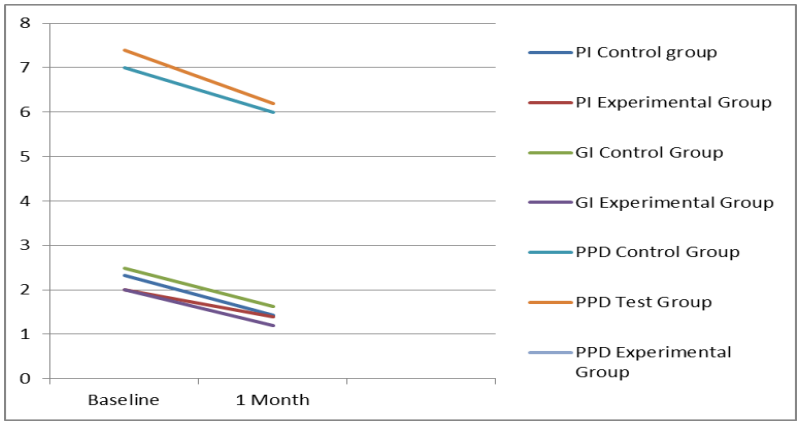
Table 3: Comparison of PPD between two groups at two interval time by Independent 't' test.

PPD Index	Baseline	1 Month
Control group	7.00 ±0.0	6.00 ± 0.00
Experimental Group	7.40 ± 0.548	6.20 ±0.45
Independent 't' test. (p value)	0.178	0.347

There was statistically insignificant difference for PPD index at all two-interval time.



Graph 3: Comparison of PPD between two groups at two interval time by Independent 't' test.

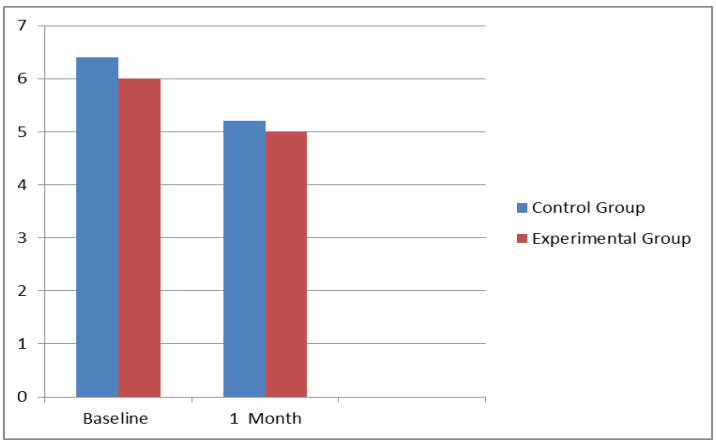


Graph 4: Comparison of all indices among two groups over two-time intervals.

Table 3: Comparison of Bacterial Count between two groups at two interval time by Independent 't' test.

Bacterial Count	Baseline	1 Month
Control group	6.40 ±0.540	5.20 ± 0.45
Experimental Group	6.00 ± 0.0	5.00 ±0.00
Independent 't' test. (p value)	0.178	0.150

There was statistically significant difference for Bacterial Count at baseline (p=0.178) and after 1 months interval with p=0.150.



Graph 5: Comparison of Bacterial Count between two groups at two interval time by Independent 't' test.

DISCUSSION

Blue-m oral gel is specially recently developed by implantologists, oral surgeons and dentists for specific targeted problems in the mouth and is claimed to possess unique properties when compare to convention local drug delivery systems.

It improves the healing of the wounds by intensifying the levels of oxygen in periodontal pockets, bleeding gum, wounds which results from traumatic extraction, in implant dentistry, chemotherapy.

Mouthwashes and gels, containing oxygenating technology has been introduced (Blue M, Europe), having anti-microbial and anti-inflammatory properties.

It prevents formation of plaque biofilm as well as promotes teeth whitening, and improves the rate of wound healing.

Fernandezy Mostajo M, 2014, Anisha Koul et al 2019 conducted the efficacy of Chlorhexidine gel and Blue-m gel as an adjunct to non-surgical periodontal therapy (SRP) in ≤ 5mm periodontal pockets, with regard to its clinical effectiveness and bactericidal properties, concluded that Both the gels, chlorhexidine gel and blue m gel were equally effective and comparable in management of chronic periodontitis.

Manthena S et al 2015 conducted a study evaluate the efficacy of CHX varnish and gel as an adjunct to scaling and root planing (SRP) in reducing microbial count within moderate to deep periodontal pockets, & concluded that Subgingival application of highly concentrated CHX varnish following SRP is beneficial in reducing microbial count in moderate to deep periodontal pockets.

I .M. Makeyeva, N.V. Tambovtseva et al 2014 conducted Application of toothpaste and mouthwash "BLUE-M" in complex hygienic oral care for patients with coronary heart disease, & Concluded that toothpaste and mouthwash "Blue-M" with active oxygen and lactoferrin provides positive dynamics of hygienic oral status and decreases severity of inflammatory changes of gingival tissue in patients with coronary heart disease.

Tatiana Miranda Deliberador et al 2020 conducted a Application of blue m Oral Gel versus Chlorhexidine on *Porphyromonas gingivalis in Vitro* Comparative Analysis & conducted that blue m at higher concentrations provided inhibitory halo of Porphyromonas gingivalis similar to 0.12% chlorhexidine digluconate, while blue m at lower concentration had a lower bacterial inhibition halo compared to chlorhexidine.

R. Niveda et al 2020 conducted that Effect of Oxygen Releasing Oral Gel Compared to Chlorhexidine Gel in the Treatment of Periodontitis & concluded that within the limitations of the study from the results it is seen that there is a significant difference in reduction in probing pocket depth

CONCLUSION

Blue-m gel can be used as reliable option or alternative to SRP in the present study. The application of the Blue-M gel showed significant improvement in the PI and GI, PD was observed. Blue m gel has shown to be effective in treating & in reducing microbial count in mild to moderate periodontal pockets.

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