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Original Research Article

Evaluation of the Beneficial Clinical Effects of Scaling and Root Planing with 0.2% Clorhexidine over Scaling and Root Planing as a Monotherapy

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Abstract: Evaluation of the clinical effects of scaling and root planing (SRP) alone or in combination with 0.2% chlorhexidine (CHX) rinsing. A blind, placebo-controlled, randomized clinical trial was conducted in 30 subjects with generalized chronic periodontitis. Subjects were assigned to two therapeutic groups: control (SRP + placebo) and test (SRP + CHX up to 42 days post-therapy). Sites (4–6 mm) in the test group showed less plaque accumulation, gingival bleeding, bleeding on probing and a greater reduction in attachment level and probing depth (PD) at 42nd days after treatment. The combination of CHX rinses and SRP leads to better clinical benefits than SRP alone.
Keywords: Chlorhexidine, Scaling and Root planing, Placebo

INTRODUCTION

Periodontal diseases are chronic inflammatory conditions characterised by loss of connective tissue, alveolar bone resorption and formation of periodontal pockets as a result of the complex interaction between pathogenic bacteria and host immune response [1]. Periodontitis is result of cumulative exposure of dental plaque, thus the main aim of periodontal therapy is the prevention of plaque accumulation and maintain periodontal health. The clinical effect of scaling and root planing (SRP) are well documented [2-4]. These studies indicated that SRP decreased pocket probing depth and loss of attachment level measurements particularly at the deeper sites

Although mechanical treatment significantly decreases the prevalance and levels of sub gingival microorganisms, it does not necessarily eliminate all pathogens [5]. As probing depth increases, the effectiveness of scaling and root planing decreases leaving subgingival plaque and calculus on the root surfaces [6], and repopulation of scaled teeth from bacterial reservoirs in dentinal tubules [7]. Haffajee *et al.;* reported that SRP alone has limited effect on some pathogenic species [5]. Microbiological techniques demonstrated that the combination of SRP and repeated professional plaque removal could have a beneficial effect on the sub gingival microbiota [8, 9]. This has led to use of antimicrobial agents as an adjunct to periodontal therapy.

To improve the outcome of mechanical oral hygiene procedures several antimicrobial agents, delivered by rinsing, irrigation, systemic administration and local devices, have been used to overcome the limited efficacy of conventional treatment of periodontitis [10]. One of the most frequently antimicrobial agents used is chlorhexidine gluconate(CHX) ,it is a broad spectrum antiseptic with a pronounced antimicrobial effect on both gram negative and gram positive bacteria as well as on some yeast and lipophilic viruses and its prolonged substantivity is still recognized as the gold standard for chemical plaque control [11]. 0.2% chlorhexidine solution was the first clinically effective mouth rinse that inhibited supragingival plaque formation [12] this study we will aim to evaluate a) the effects of Scaling and Root planing with or without 0.2 % Chlorhexidine rinse on clinical parameters

MATERIALS AND METHODS

30 Subjects were randomly selected comprising of both the sexes, visiting outpatient department of Periodontology, Govt. Dental College and Hospital Srinagar, were considered for the present clinical study after meeting inclusion and exclusion criteria. The criteria for inclusion in the study were that, Patients of age between 25-50 years. Patients diagnosed as suffering from chronic generalized periodontitis determined on clinical and radiographic examination,

Minimum of 4 teeth with one site with pocket depth ≥5mm& ≤7mm, Cooperative patients who are able to attend the hospital at frequent intervals. The criteria set for exclusion were, Patient who had not received any type of invasive periodontal therapy for past 4 months, Presence of any systemic disease that would influence the course of periodontal disease, Pregnancy and lactation, Smoking habit, Allergic to chlorhexidine, Subjects having periapical lesions, gingival abscess, periodontal abscess, Patients with no history of antimicrobial drug intake for 7days or longer in previous 3 months. Before the selected subjects were taken up for the study, they were made to sign a written consent from regarding the benefits and protocol of the study.

After the selection of subjects for the study based on the inclusion and exclusion criteria, the periodontal examination was done. Subjects were randomly assigned into two groups:- 15 Subjects in Control Group(Group A) and 15 Subjects in Treatment Group (Group B), Control group- Group A (SRP + PLACEBO), Treatment group- Group B (SRP + 0.2% CHX) .

At the baseline, 4-Non adjacent periodontal pockets in posterior segment of mouth measuring depth ≥5mm& ≤7mm were assed. Following periodontal parameters were recorded in both groups (Group I and Group II) at BASELINE: Plaque index (Sillness and Loe ,1964) [13]. Sulcus bleeding index (Muhlemann H.R and son, 1971) [14]. Probing Pocket depth. (With Williams Graduated Periodontal Probe) [15]. Relative Attachment level i.e. distance between base of Sulcus or pocket and a fixed reference point (horizontal notch) on the acrylic stent [15].

The treatment procedure was as follows, the Control group(Group A – SRP + PLACEBO) Will receive oral hygiene instructions and full mouth scaling using ultra-sonic scaler (magneto strictive) followed by root planing using Gracey curettes performed under local anaesthesia if required. Put on saline rinses after completion of periodontal therapy till 42nd day. Treatment group(Group B - SRP + 0.2% CHX) Received oral hygiene instructions and full mouth scaling using ultra-sonic scaler (magnetostrictive) followed by root planing using Gracey curettes performed under local anaesthesia if required. Were put on 0.2% chlorhexidine rinses 15 ml twice a day after completion of periodontal therapy till 42nd day with a gap of 3 days on 21st day to reduce the side effects.

Following periodontal parameters will be recorded in both groups (Group A and Group B) at day 21.Plaque index (Sillness and Loe, 1964) [13]. Sulcus bleeding index (Muhlemann H.R and son, 1971) [14]. Reinforce oral hygiene instructions. A gap of 3days for CHX rinses. Following periodontal parameters will be recorded in both groups (Group A and Group B) at day 42. Plaque index (Sillness and Loe1964) [13]. Sulcus bleeding index (Muhlemann H.R and son, 1971) [14]. Probing Pocket depth. (With Williams Graduated Periodontal Probe) [15]. Relative Attachment level i.e. distance between base of Sulcus or pocket and a fixed reference point (horizontal notch) on the acrylic stent [15]. Following oral hygiene instructions were paid 1.Brushing once daily with Colgate dentifrice in both control and test group using Bass methods.2.Use of no adjunctive interdental aids in both test and control.3.Use of mouthwash half an hour after breakfast and tooth brushing and at night before going to sleep. 4. Not to drink or eat till half an hour after mouthwash.

RESULTS AND OBSERVATIONS

Of the 30 subjects selected, the mean baseline clinical parameters for the two subject groups were tabulated: Mean plaque index of control group (Group A- SRP +PLACEBO) at baseline was 1.8805, at day 21 was 1.4297, at day 42 was 1.2195.Therefore, the difference in the mean plaque index scores between baseline to 21day and baseline to 42 days was 0.4508 and 0.6610 with p value 0.006 which is statistically significant and p value <0.001 highly significant. Mean plaque index of test group (Group B- SRP +CHX) at baseline was 1.9164 at 21 day was 1.2756 and 42 day was 0.9871. Difference in the mean plaque index scores between baseline to 21day and From baseline to 42 days was 0.6408 and 0.9293 with p value <0.001 which is statistically highly significant in both.

On comparison between the two groups at the baseline the difference was statistically not significant. The test grp (group B) showed greater improvements in plaque control index scores than control group (group A) .The difference in results showed a statistically significant decrease at day 21 (p 0.001) statistically highly significant decrease at day 42 (p < 0.001). Mean sulcus bleeding index of control group (Group A- SRP +PLACEBO) at baseline was 1.8805 ,at day 21 was 1.1004,at day 42 was 0.9479.The difference in the mean sulcus bleeding index scores between baseline to 21day was 0.7704 with p value 0.003 which is statistically significant . From baseline to 42 days the difference in mean sulcus bleeding index scores are 0.9229 with p value <0.001 highly significant.

Mean plaque index of test group (Group B- SRP +CHX) at baseline was 1.9168 at 21 day was 0.9839 and 42 day was 0.7900. Therefore, the difference in the mean sulcus bleeding index scores between baseline to 21day was 0.9329 with p value <0.001 which is statistically highly significant. From baseline to 42 days the difference in mean sulcus bleeding index scores are 1.1268 with p value <0.001 highly significant. On comparison between the two groups at the baseline the difference was statistically not significant. The test grp (group B) showed greater improvements in sulcus bleeding index scores than

control group (group A) .The difference in results showed a statistically significant decrease at day 21 (p 0.004) and statistically highly significant decrease at day 42 ($p < 0.001$). Mean probing pocket depth in control group (Group A- SRP +PLACEBO) at baseline was 6.82, at day 42 was 4.31.In control group (group A) the reduction in mean probing poket depth from the baseline to 42 days was 2.51mm with a p value <0.001 which is statistically highly significant . Mean probing pocket depth in test group (Group B- SRP +CHX) at baseline was 6.89, at 42 day was 3.90 .In test group (group B) the reduction in mean probing poket depth from the baseline to 42 days was 2.99mm with a p value <0.001 which is statistically highly significant .

On comparison between the two groups at the baseline the difference was statistically not significant. Whereas at day 42 nd the test grp (group B) showed greater improvements in mean probing pocket depth scores than control group (group A) .The difference in results showed a statistically significant decrease of probing depth at day 42 ($p < 0.013$). Mean relative attachment level in control group (Group A- SRP +PLACEBO) at baseline was 9.82, at day 42 was 7.26. In control group (group A) the reduction in mean relative attachment levels or the mean gain of attachment from the baseline to 42 days was 2.56mm with a p value <0.001 which is statistically highly significant. Mean relative attachment level in test group (Group B- SRP +CHX) at baseline was 9.89, at 42 day was 6.93.In test group (group B) the reduction in mean relative attachment levels or the mean gain of attachment from the baseline to 42 days was 3.32 mm with a p value <0.001 which is statistically highly significant . On comparison between the two groups at the baseline the difference was statistically not significant. The test grp (group B) showed greater reduction in mean relative attachment levels or the mean gain of attachment than control group (group A) on 42nd day .The results showed a statistically significant difference at day 42 ($p < 0.012$).

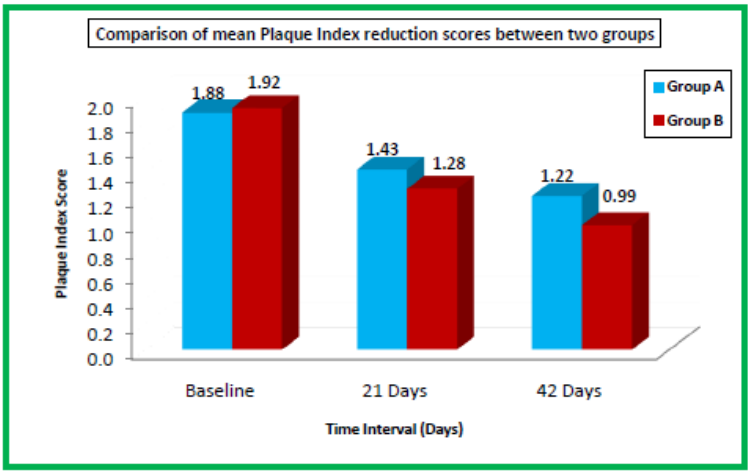

Fig 1: Comparison of mean plaque index scores of group A (control group) and group B (Test group) on baseline and day 42nd

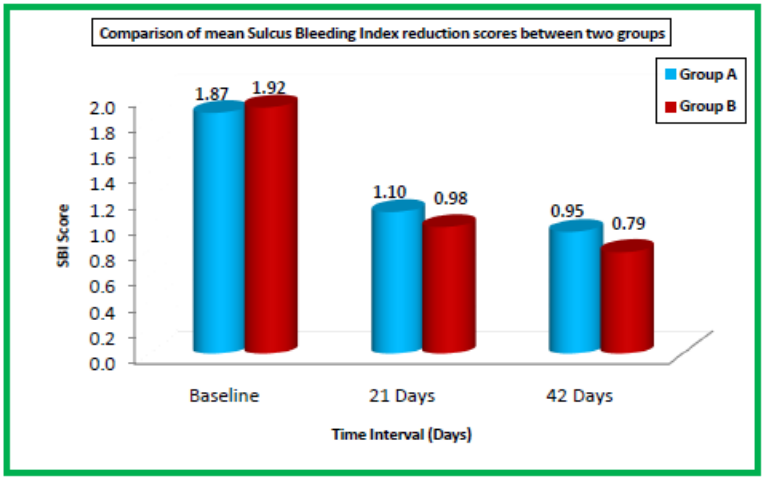

Fig 2: Comparison of mean sulcus bleeding index scores of group A and group B on baseline and day 42nd

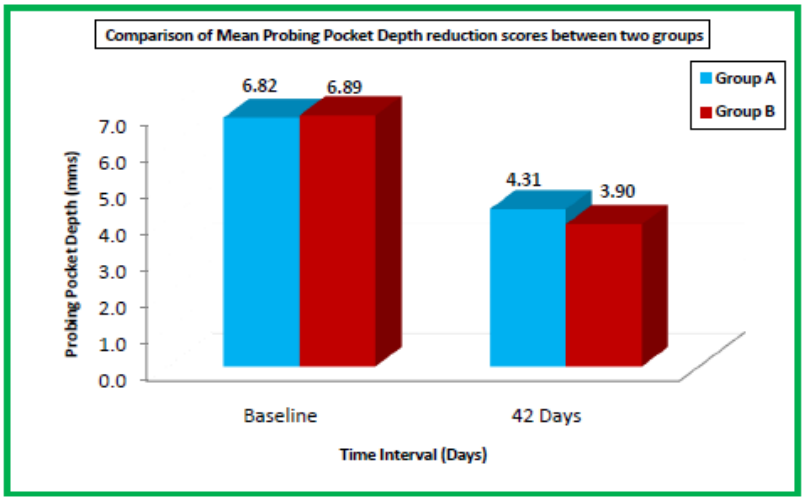

Fig 3: Comparison of mean probing pocket depth scores of group A and group B on baseline and day 42nd

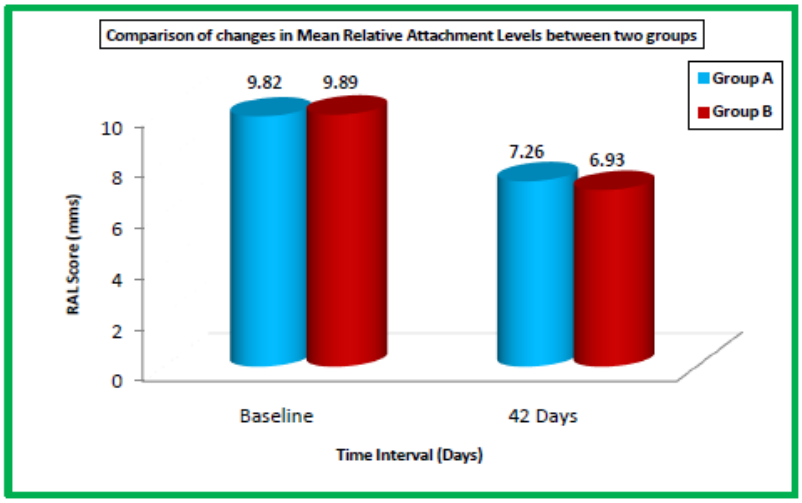

Fig 4: Comparison of mean relative attachment level scores of group A and group B on baseline and day 42nd

DISCUSSION

To improve the outcome of mechanical oral hygiene procedures, a number of different antiseptic substances have been incorporated into mouthrinses. One of the most frequently used compounds, CHX digluconate, is a broad-spectrum antiseptic with a pronounced antimicrobial effect on both Gram-negative and Gram-positive bacteria, as well as on fungi and some viruses [13, 16, 17]. Thus, the purpose of this placebo controlled study was to test the difference in the effect of treatment with the adjunctive use of CHX rinsing during non-surgical periodontal treatment compared with SRP alone, in subjects with chronic periodontitis at day 42 after the completion of SRP.

The difference in reduction in plaque index could be due to demonstrated action of 0.2% CHX in inhibiting supragingival plaque formation and the development of gingival inflammation [18]. These results were found to be consistent with the studies of Grossman *et al.;* in 1985 [19], Sanz *et al.;* in 1994 [20] that confirm the antiplaque efficiency of CHX rinses .The superior antiplaque activity of chlorhexidine is due to its property of sustained availability –"substantivity "of 8-12 hours this involves a reservoir of Chlorhexidine, slowly dissolving from all oral surfaces, resulting in the "Bacteriostatic mileu" the oral cavity. The bacterial component of the plaque formed using chlorhexidine rinses has been reported to be in different states of lysis and the plaque vitality scores was found to be less as compared to controls [21]. Thus, chlorhexidine may have both quantitative and qualitative effects on deposits formed in its presence. The reductions in sulcus bleeding score are comparable to the results reported by Badersten *et al.;* in 1987 [22] on single rooted teeth [23, 24]. The greater difference in reduction in sulcus bleeding index scores could be also attributed to decrease in gingival inflammation [18]. These results were found to be consistent with the studies of Grossman *et al.;* in 1985 [19], Sanz *et al.;* in 1994 [20] that confirm the antiinflammatory effect of CHX rinses.

The difference in the mean reduction in

probing pocket depth between Group A Group B at baseline and 42nd was statistically significant (p value <0.05). These results were found to be consistent with the studies of Christie P [23], Faveri M [25]. Although the reduction in group B was statistically more significant, it could be because maintainence of strict supragingival plaque control in a previously cleaned site effectively retards the decolonization of sub gingival plaque [26] decrease in amount of inflammation, it may to some extent explain this improved reduction in probing depth

Mean gain in attachment level between Group A Group B at 42nd day was statistically significant (p value <0.05). These results were found to be consistent with the studies of (Christie P [23] ,Faveri M [25]).Although the reduction in group B was significantly more this could be due to maintainence of strict supragingival plaque control in a previously cleaned site (supragingival and subgingival) effectively retards the recolonization of subgingival plaque (Katsanoulas)[26].Thus the effect of CHX in altering subgingival microbiota by preventing the recolonization of putative periopathogens into the pocket .Also the property of " substantivity " of CHX[27] , thereby creating more healthy periodontal environment for attachment gain. Hence, to conclude CHX rinsing and repeated professional plaque removal could have equivalent therapeutic benefits, the use of CHX offers the great advantage of not requiring the patient's presence in the dental office.

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