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Scaling and root planing and chlorhexidine mouthrinses in the treatment of chronic periodontitis: a randomized, placebo-controlled clinical trial

Marcelo Faveri[1], Lauren Christine Gursky[1], Magda Feres[1], Jamil Awad Shibli[1], Sergio Luiz Salvador[2] and Luciene Cristina de Figueiredo[1]

[1]Department of Periodontology, Dental Research Division, Guarulhos University, Guarulhos, SP, Brazil [2]Department of Clinical Analyses, School of Pharmaceutics Sciences, University of São Paulo, Ribeirão Preto, Brazil

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Abstract

Objective: Evaluation of the clinical and microbiological effects of scaling and root planing (SRP) alone or in combination with 0.12% chlorhexidine (CHX) rinsing.

Methods: A blind, placebo-controlled, parallel-design, randomized clinical trial was conducted in 29 subjects with chronic periodontitis. Subjects were assigned to two therapeutic groups: control (SRP+placebo) and test (SRP+CHX during and up to 42 days post-therapy). Clinical and microbiological [*N*-benzoyl-DL-arginine-2-naphthylamide (BANA test)] examinations were performed at baseline, 42 and 63 days post-therapy.

Results: Initially, intermediate 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 63 days after treatment. The initially deep sites (>6 mm) in the CHX group also showed a better reduction in plaque accumulation and in PD compared with the control group. Both therapies led to a microbiological improvement; however, the test subjects showed a higher frequency of BANA-negative sites after treatment, which was sustained over time ($p < 0.001$). At 63 days, the control group presented 25 BANA-negative sites and 65 positive sites, and the test group 58 and 26, respectively.

Conclusion: The combination of CHX rinses and SRP leads to clinical benefits and to a better reduction in BANA-positive species.

Key words: BANA test; chlorhexidine; dental plaque; periodontal disease; scaling and root planing

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Several treatments for periodontal diseases have been extensively studied, but the ideal form of the therapy has not yet been determined (Pihlstrom et al. 1981, Badersten et al. 1981, 1984, 1987, Lindhe et al. 1983, Beltrami et al. 1987, Claffey et al. 1988, Kaldahl et al. 1988, Greenstein 1992, Bollen et al. 1996, Haffajee et al. 1997, Christie et al. 1998, Cugini et al. 2000, Cobb 2002, Carvalho et al. 2004, 2005, Colombo et al. 2005). Scaling and root planing (SRP) is the most common periodontal treatment and its clinical effects are well documented. These studies indicated SRP as being beneficial in terms of reducing inflammation and decreasing probing depth (PD) and attachment-level measurements (Morrison et al. 1980, Badersten et al. 1981, Lindhe et al. 1983, Pihlstrom et al. 1983, Ramfjord et al. 1987, Kaldahl et al. 1993, Haffajee et al. 1997, Carvalho et al. 2004, 2005, Colombo et al. 2005). These clinical improvements are associated with microbiological changes that include a decrease in total counts of microorganisms and in the mean percentage of certain pathogens, such as *Treponema denticola*, *Porphyromonas gingivalis* and *Tannerella forsythia* (Slots 1979, Pedrazzoli et al. 1991, Haffajee et al. 1997, Colombo et al. 2005).

Investigations have, however, demonstrated that SRP alone has a limited effect on some pathogenic species (Haffajee et al. 1997, Cugini et al. 2000, Colombo et al. 2005). Haffajee et al. (1997) reported that SRP alone was a useful

treatment in 68% of patients, resulting in no loss or in a modest gain of mean clinical attachment levels (CALs) up to 3 months post-therapy, whereas 32% of the subjects showed little benefit from this non-surgical therapy alone and continued to show high levels of putative pathogens and progressive clinical attachment loss. Therefore, regular supportive periodontal therapy is essential for maintaining long-term periodontal health (Axelsson & Lindhe 1981, Cugini et al. 2000), and supragingival plaque control is considered a crucial step in this direction. Well-conducted clinical investigations (Lindhe & Nyman 1975, Nyman et al. 1975, 1977, Rosling et al. 1976, Lindhe & Liljenberg 1984) established the importance of oral hygiene for the clinical success of different periodontal therapies, and the introduction of advanced molecular microbiology techniques has helped to demonstrate that the combination of SRP and repeated professional plaque removal could have a beneficial effect on the composition of the subgingival microbiota (Ximénez-Fyvie et al. 2000a, Haffajee et al. 2003, Carvalho et al. 2004, 2005).

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 (Loesche 1979, Addy & Moran 1983, Briner et al. 1986, Gjermo 1989, Marsh 1992, Albandar et al. 1994, Sekino et al. 2003). Moreover, CHX is able to prevent plaque formation for several hours, due to its high affinity for oral surfaces (Lang & Brecx 1986, Barkvoll et al. 1989).

Thus, the purpose of this blind, randomized placebo-controlled study was to test the null hypothesis that there was ''no difference in the effect on treatment with the adjunctive use of CHX rinsing during non-surgical periodontal treatment compared with SRP alone'', in subjects with chronic periodontitis at 42 and 63 days after the completion of SRP.

Material and Methods

Subject population

Thirty Brazilian subjects with chronic periodontitis were selected from the population referred to the periodontal clinic of Guarulhos University (Guarulhos, SP, Brazil). A complete periodontal examination was performed (see *Clinical monitoring*), including a medical and dental history, an intra-oral examination and full-mouth periodontal probing. The periodontal diagnosis was made, and subjects who fulfilled the inclusion/exclusion criteria were invited to participate in the study. If they accepted, they were informed of the nature, potential risks and benefits of study participation, and after signing an Ethics Committee-approved informed consent; they were entered in the study.

Inclusion and exclusion criteria

The study included subjects >30 years of age with at least 15 teeth and a minimum of six teeth with at least one site with PD between 5 and 7 mm and CAL between 5 and 10 mm. The exclusion criteria were as follows: previous periodontal therapy, pregnancy, nursing, smokers, any systemic condition that could affect the progression of periodontal disease or that required antibiotic coverage for routine dental therapy, allergy to CHX and antibiotic therapy in the previous 6 months.

Sample size calculation

The sample size calculation determined that 14 subjects per group would provide an 80% power to detect a true difference of 1.0 mm between test and placebo using probing pocket depth reduction in pockets $\geqslant 6$ mm as the primary outcome variable. This calculation was based on a two-tailed comparison at $\alpha = 0.05$.

Randomization and allocation concealment

During the enrollment visit, each subject was given a code number, and a computer-generated table was used to have them randomly assigned to receive one of the two proposed treatments. The coordinator of the study (L. C. F) assigned participants to their groups.

Guarulhos University pharmacy prepared the placebo and the CHX rinsing for the 30 subjects. Two hundred and seventy opaque plastic tubes (135 placebo and 135 CHX 0.12%; nine per subject) containing 220 ml of the mouthwashes, in two packs, were sent to the study coordinator, who marked the code number of each subject on a set of nine tubes, according to the therapy assigned. The coordinator gave the coded tubes to the two examiner researchers (M. F. and L. C. G.), who at no time during the study had any access to information about the contents of the tubes or the assignment of the subjects to the two therapies. All study personnel, including the biostatistician and participants, were blinded to treatment assignment for the duration of the study.

Experimental design and treatment

In this single-blinded, parallel-design, randomized and placebo-controlled clinical trial, subjects were randomly assigned to one of the following treatment groups: control (C): SRP+placebo rinses and test (T): SRP+ CHX 0.12% rinses (CHX). During the initial phase, subjects received clinical and microbiological monitoring, instruction in proper home-care techniques and full-mouth supragingival scaling (Haffajee et al. 1997). Moreover, all volunteers received the same toothpaste (Colgate Total®, Anakol Ind. Com. Ltda- Kolynos do Brasil – Colgate Palmolive Co., São Bernardo do Campo, SP, Brazil). SRP was completed in a maximum of six appointments lasting approximately 1 h each, performed under local anaesthesia. Treatment of the entire oral cavity was completed in 21 days. The CHX rinses began with the SRP and continued for 42 days after the end of this therapy. Patients were instructed to gargle with 15 ml of the assigned mouthrinse twice a day for 1 min., i.e. in the morning 30 min. after breakfast and toothbrushing, and at night, before going to sleep. The mouthrinses were specially prepared for the study. Two periods of 3-day intervals were incorporated into the experimental phase in order to minimize the side effects of CHX, such as toothstaining and unpleasant taste. No severe adverse effects were reported by any of the subjects. All subjects received clinical and microbiological monitoring at 42 and 63 days post-therapy. The experimental design is illustrated in Fig. 1.

Compliance

The subjects were asked to return to the clinic every week, when compliance was checked. In these short visits, the old tube containing the mouthwashes was returned and they received a

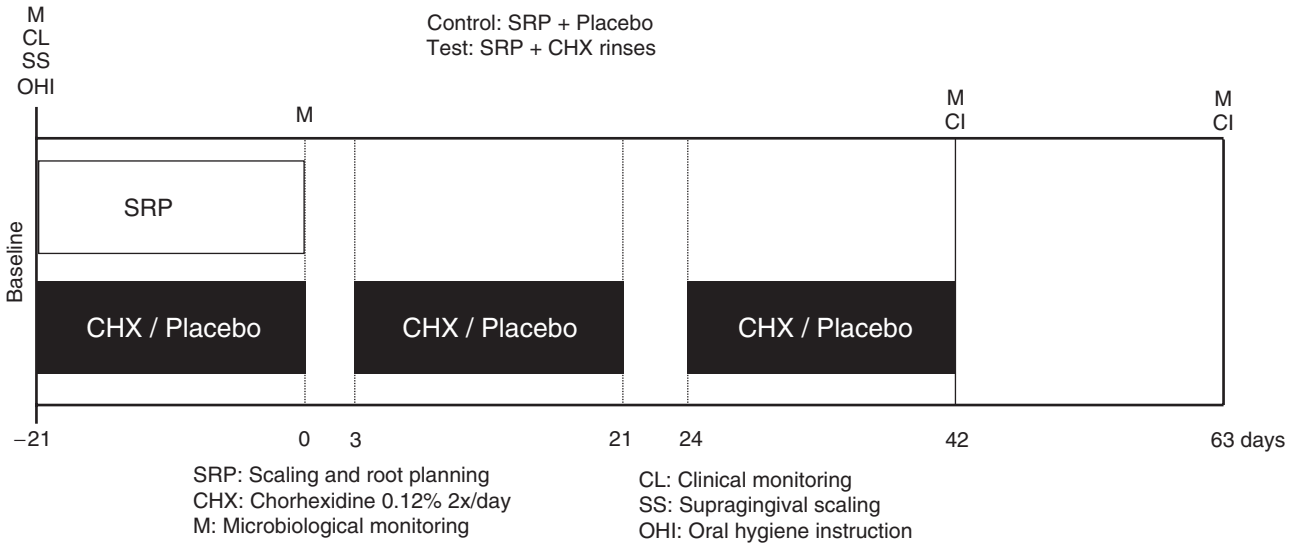

Fig. 1. Experimental design. Twenty-nine subjects were assigned to two therapeutic groups: Control ($n = 15$): scaling and root planing (SRP)+placebo rinses 2 × /day; test ($n = 14$): SRP+chlorhexidine (CHX) rinses 2 × /day. The CHX began with SRP and continued for 42 days post-therapy. Clinical measurements were performed at baseline, 42 and 63 days post-therapy. Subgingival plaque samples were collected at baseline, after completing SRP, 42 and 63 days later and analysed by the *N*-benzoyl-DL-arginine-2-naphthylamide test.

new tube of medication/placebo. The subjects were also asked about any self-perceived side effects of the mouthrinses. This inquiry was performed by the study coordinator, who also had the responsibility of calling the subjects every 3 days to monitor compliance.

Investigators calibration

A total of 10 non-study subjects with chronic periodontitis were recruited and used for the calibration exercise. The two examiners (M. F., and. L. C. G.) measured one quadrant per subject. The choice of quadrant was based on the number of teeth present. For better standardization, quadrant 1 was the fist choice, followed by 2, 3 and 4, respectively. The quadrant chosen should have at least six teeth. If a quadrant presented less than six teeth, the following quadrant was chosen. Initially, the first examiner measured PD and CAL in a given quadrant and 15 min. later the second examiner measured the same quadrant. Sixty minutes later, this same protocol was repeated, but the order of the examiners was changed. Therefore, all 10 subjects were probed twice in the same visit by each of the two examiners. Upon completion of all measurements, the intra- and inter-examiner variability for PD and CAL measurements was assessed. Calibration was performed in accordance with Araujo et al. (2003) and the standard error of measurement (SE) was calculated. The intra-examiner variability was 0.14 mm for PD and 0.31 mm for CAL. For the first examiner (M. F.), the inter-examiner mean SE variability was 0.12 mm for PD and 0.14 mm for CAL and the second examiner (L. C. G.) presented a mean SE variability of 0.15 and 0.17 mm, respectively. These trained examiners were able to provide reproducible measurements of under 0.5 mm.

Clinical monitoring

The clinical monitoring was performed by two trained and calibrated examiners (Araujo et al. 2003). One examiner performed all clinical measurements in a given group of subjects and treatment was performed by the second examiner. Thus, the monitoring clinician was masked to the treatment protocol. Subjects were clinically monitored at baseline and at 42 and 63 days post-therapy. Plaque accumulation (0/1), gingival bleeding (0/1), bleeding on probing (BOP, 0/1), suppuration (0/1) PD (mm) and CAL (mm) were measured at six sites per tooth (mesiobuccal, buccal, distobuccal, distolingual, lingual and mesiolingual) in all teeth excluding the third molar, at each visit. The PD and CAL measurements were recorded to the nearest millimetre using a North Carolina periodontal probe (Hu-Friedy, Chicago, IL, USA).

Microbiological monitoring

The *N*-benzoyl-DL-arginine-2-naphthylamide (BANA) test (BANA test, Oral Tec Corp., Manassas, VA, USA) was used to verify the presence of *T. forsythia, T. denticola* and/or *P. gingivalis* in the subgingival samples of the subjects. These anaerobic microorganisms have a trypsin-like enzyme capable of hydrolysing the synthetic substrate, BANA.

Subgingival plaque samples were collected at baseline, right after SRP, 42 and 63 days post-therapy, from six non-contiguous inter-proximal sites per subject, with PD between 5 and 7 mm and CAL between 5 and 10 mm. The selected sites were randomized in different quadrants. After the clinical parameters had been recorded, the supragingival plaque was removed and the samples were taken with individual sterile Gracey curettes and immediately placed on a BANA-impregnated strip along the lower edge of a test card. An upper reagent strip containing Gran's black dye was then activated by moistening it with distilled water, and the two strips were folded over so they were in contact with one another. After folding, the card was incubated at 55°C for 15 min. (Loesche et al. 1990). The results were scored as strong, dark blue spots (score 2 – positive result); weak, light blue spots (score 1 – positive result); or no colour change (score 0 – negative result).

Statistical analysis

Clinical monitoring

The mean percent of sites with visible plaque, gingival bleeding, BOP and suppuration, as well as mean PD and CAL were computed for each subject and then averaged across subjects in the two treatment groups at each time point. The significance of differences over time (baseline, 42 and 63 days) in each group was sought using the Friedman test. Significance of differences between the treatment groups was sought using the Mann–Whitney *U*-test.

Microbiological monitoring

The frequency of detection of the BANA scores was computed for each subject in the two treatment groups at each time point. Significance of difference between the treatment groups was sought using the χ^2 test. The significance of differences over time (baseline, 42 and 63 days) in each group was sought using *Q* Cochran and McNemar's χ^2 test.

The level of significance for all tests was set at 5%.

Table 1. Demographic characteristics and mean (± SD) full-mouth baseline clinical parameters for the two treatment groups

Variable	Treatment group	
	control (SRP) $n = 15$	test (SRP+CHX) $n = 14$
Gender (M/F)	8/7	5/9
Age (years)†	42.1 ± 6.5	48.5 ± 8.8
Pocket depth (mm)†	3.85 ± 0.66	3.68 ± 0.39
Clinical attachment level (mm)†	4.40 ± 1.02	4.27 ± 0.74
% sites		
Plaque accumulation†	82.25 ± 12.01	79.74 ± 14.70
Gingival bleeding†	40.17 ± 19.46	33.02 ± 11.37
Bleeding on probing†	62.05 ± 19.34	59.22 ± 16.85
Suppuration†	2.75 ± 3.34	2.25 ± 2.09

†$p > 0.05$; significant differences between treatment groups at baseline (Mann–Whitney *U*-test). SRP, scaling and root planing; CHX, chlorhexidine 0.12%.

Results

Of the 30 subjects selected, one had taken an antibiotic during the course of the study (group T) and was excluded from the data analysis. Therefore, clinical and microbiological data for 29 subjects were available for analysis. The mean baseline clinical parameters for the two subject groups are presented in Table 1. The demographic and clinical baseline characteristics were similar between the two groups ($p > 0.05$).

Figure 2 presents the mean full-mouth values for the clinical parameters at baseline, 42 and 63 days post-therapy. The percentage of sites exhibiting plaque, gingival bleeding, BOP and suppuration as well as mean full-mouth PD and CAL were significantly reduced at 63 days post-therapy in both treatment groups ($p < 0.01$).

Even though no differences in the clinical parameters were observed between the two groups at baseline, the percentage of sites with visible plaque, gingival bleeding, BOP and the mean PD and CAL were significantly lower in

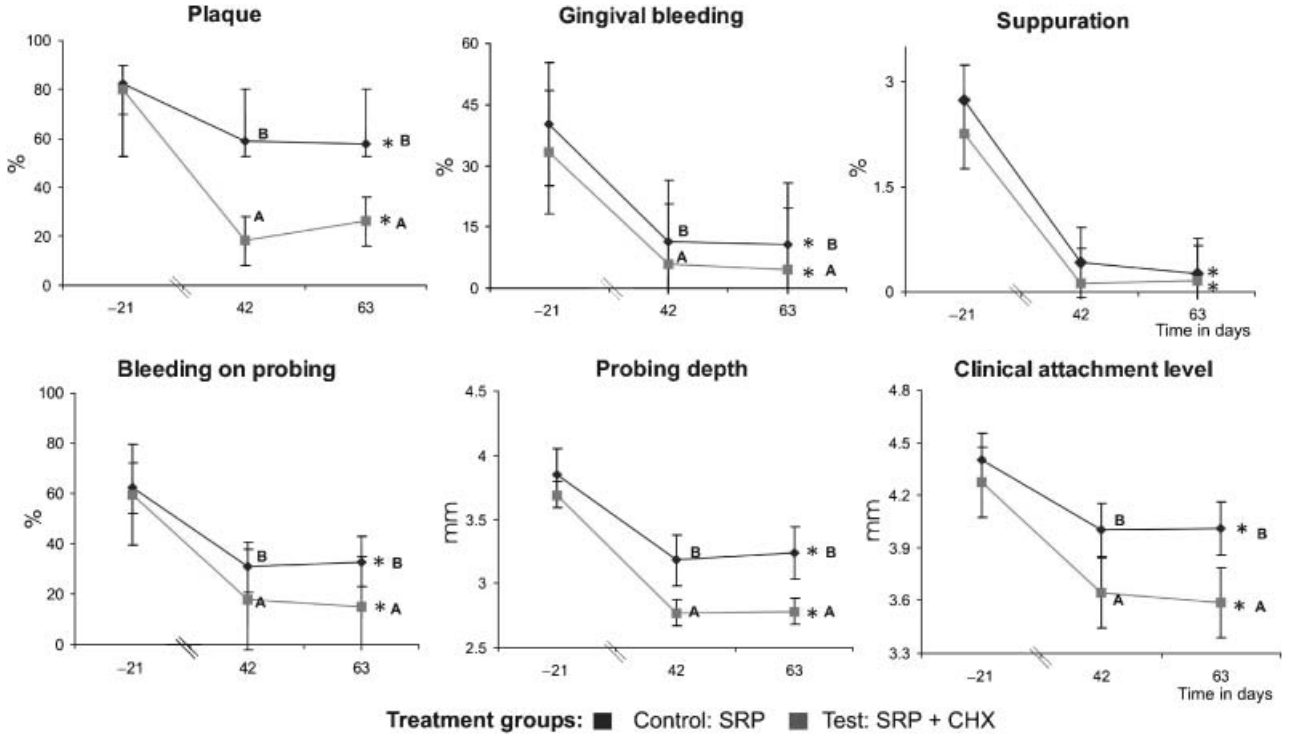

Fig. 2. Plots of the full-mouth mean values for the clinical parameters at baseline, 42 and 63 days post-therapy for the two treatment groups (control and test). Significance of difference over time within the group was tested using the Friedman test (*$p < 0.01$). Significance of difference between treatment groups at 42 and 63 days post-therapy was tested using the Mann–Whitney *U*-test ($p < 0.05$; different letters next to treatments indicate statistically significant differences between groups). SRP, scaling and root planing; CHX, chlorhexidine 0.12%.

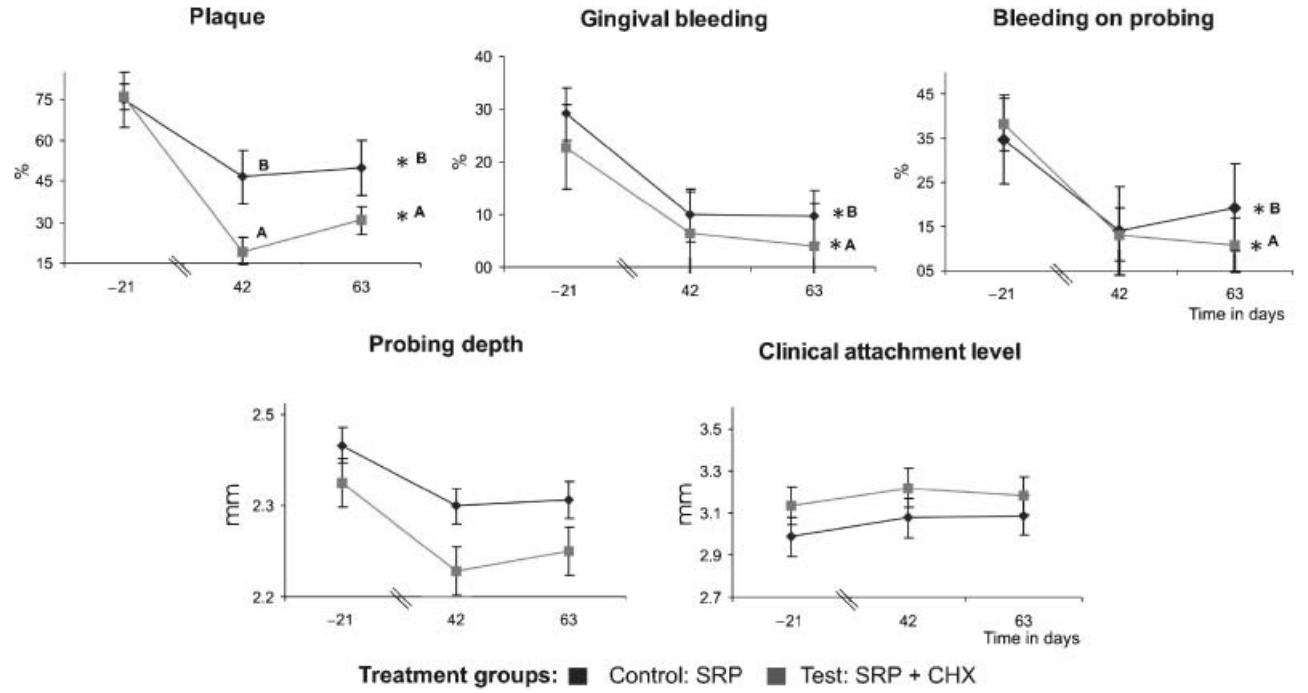

Fig. 3. Plots of the mean values for the clinical parameters at baseline, 42 and 63 days post-therapy for sites with baseline probing depth <4 mm, in the two treatment groups (control and test). Significance testing and legends are as described in Fig. 2.

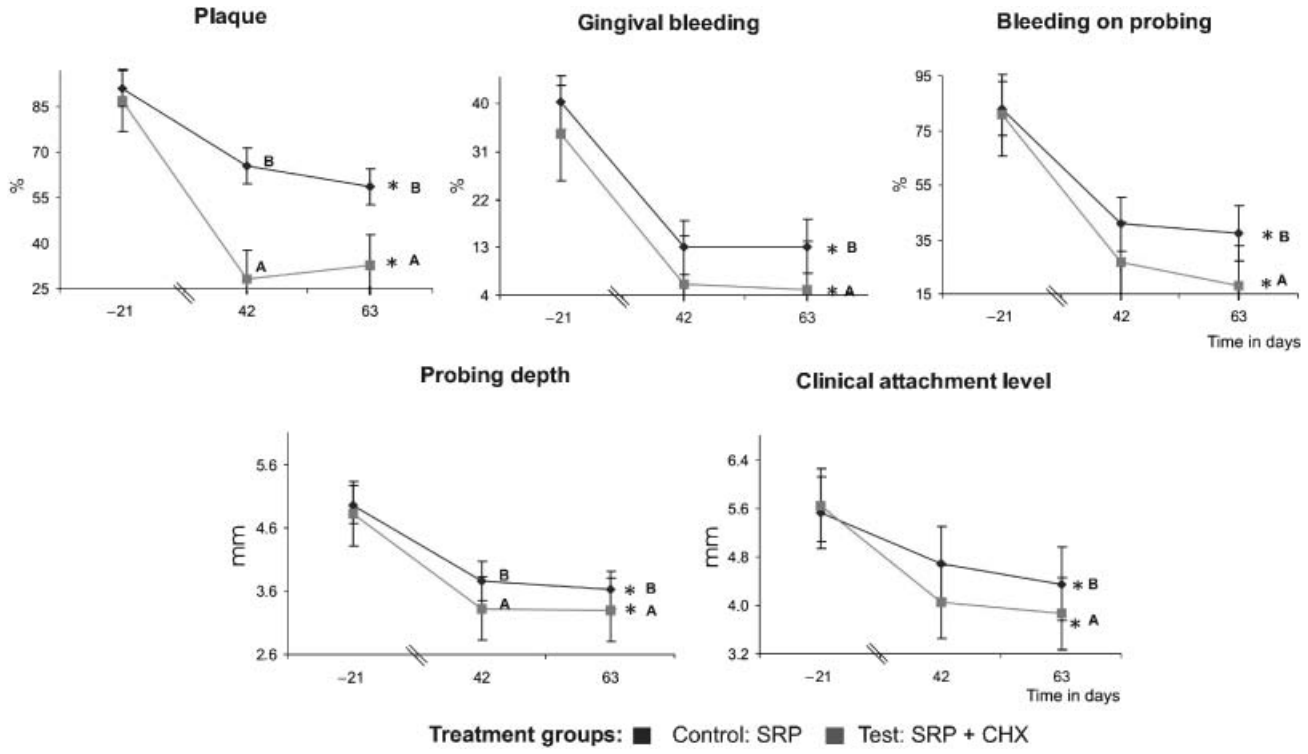

Fig. 4. Plots of the mean values for the clinical parameters at baseline, 42 and 63 days post-therapy for sites with baseline probing depth 4–6 mm, in the two treatment groups (control and test). Significance testing and legends are as described in Fig. 2.

the test group at 42 and 63 days post-therapy ($p<0.05$).

In order to better understand the effect of the therapies and to allow more comprehensive comparisons between the groups, the sites were subset into baseline PD categories of shallow (<4 mm), intermediate (4–6 mm) and deep (>6 mm), and the statistical analysis was repeated. Figures 3–5 present the mean values of each clinical parameter in the three PD categories at

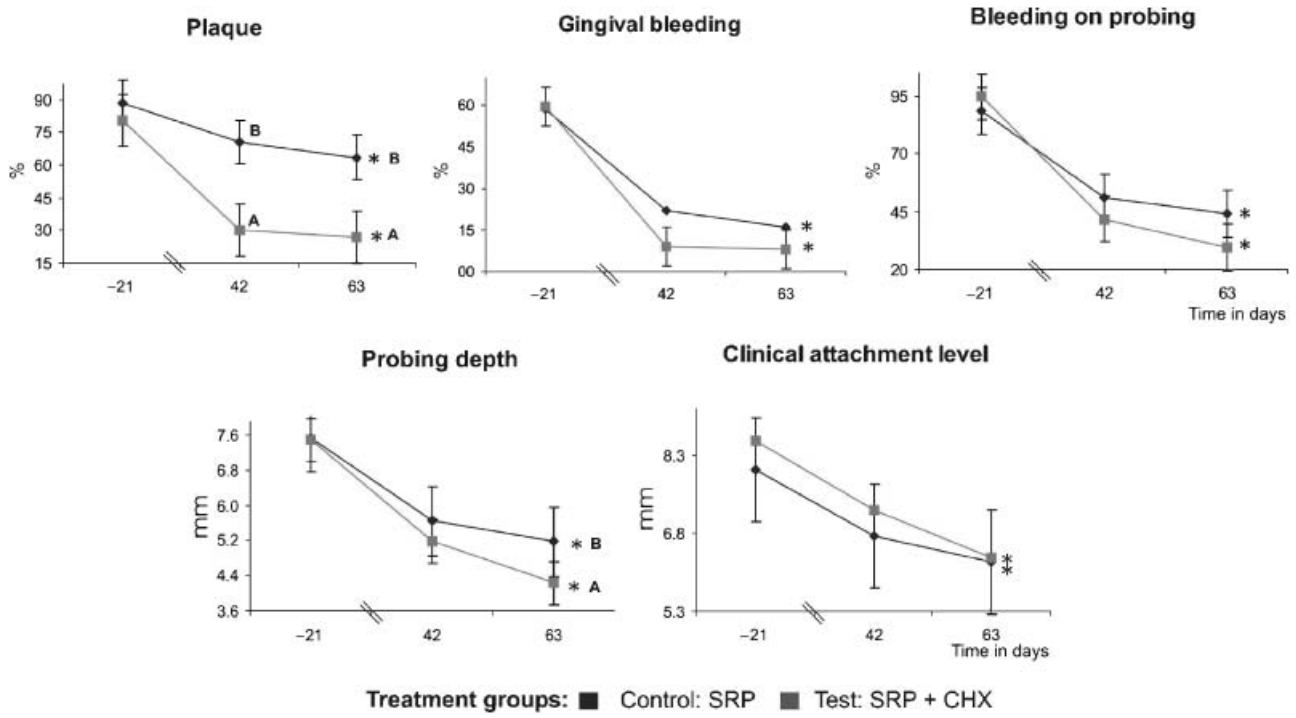

Fig. 5. Plots of the mean values for the clinical parameters at baseline, 42 and 63 days post-therapy for sites with baseline probing depth >6 mm, in the two treatment groups (control and test). Significance testing and legends are as described in Fig. 2.

all time points. A reduction in the clinical parameters was observed post-therapy for all PD categories ($p<0.01$), except for the baseline shallow pockets (<4 mm), which showed an increase in the mean CAL in both treatment groups ($p>0.05$). At baseline, no significant differences were observed between the two groups for all PD categories; however, differences were seen at the other time points. The test group had a significantly lower % of sites with plaque at 42 and 63 days post-therapy for all categories of pockets, and with gingival bleeding and BOP at 63 days in the shallow and intermediate sites. The test group also showed a lower mean PD at 42 and 63 days for intermediate sites and at 63 days for the deep sites, compared with the control group ($p<0.05$). CAL was also significantly reduced in the test group in the intermediate sites at 63 days post-therapy.

Figure 6 presents the mean changes from baseline to 42 and to 63 days post-therapy for PD, CAL and BOP in the different baseline PD categories. The initially shallow pockets in the two treatment groups showed a mean reduction in the % of sites presenting BOP and in PD post-therapy, while the CAL showed a small increase from baseline to 42 and to 63 days after treatment in both groups. No significant differences of mean changes in these clinical parameters were observed between the two groups for the initial shallow sites.

In the initially intermediate site category (PD 4–6 mm), all clinical parameters showed a greater reduction in the CHX group. Although these differences were not statistically significant at 42 days, at 63 days post-therapy, the mean reductions in CAL and in the % of sites with BOP were significantly different between the two groups. In sites with baseline PD>6 mm, subjects who rinsed with CHX also showed an overall better reduction in the clinical parameters. The mean reductions in PD, CAL and in sites presenting BOP were significantly greater in these subjects at 63 days after treatment.

The baseline microbiological data analysis showed that the two groups were homogeneous as regards the distribution of the BANA results (Table 2, $p>0.05$). Immediately after SRP, 42 and 63 days post-therapy, however, group T showed a greater frequency of sites with BANA-negative results compared with the control group ($p<0.05$).

Figure 7 shows the negative (score 0) and positive results (scores 1+2) of the BANA test in groups C and T at all time points. Both groups had a reduced frequency of BANA-positive sites (C = 90–65 and T = 82–26) and increased frequency of BANA-negative sites (C = 0–25 and T = 2–58). These results were more marked and better sustained over time in subjects who rinsed with CHX.

Discussion

Several combined therapies for the treatment of periodontal infections have been successfully applied (Lindhe et al. 1983, Greenstein 1992, Loesche et al. 1993, Colombo et al. 1998, Feres et al. 1999, 2001, Grisi et al. 2002, Levy et al. 2002), including the association of SRP and repeated professional removal of supragingival plaque (Magnusson et al. 1984, McNabb et al. 1992, Christie et al. 1998, Quirynen *et al.* 2000, Ximénez-Fyvie et al. 2000a, Haffajee et al. 2003, Carvalho et al. 2004, 2005). As CHX is the ''gold standard'' antiseptic for supragingival plaque control (Loesche 1979, Briner et al. 1986, Gjermo 1989, Marsh 1992, Albandar et al. 1994, Eaton et al. 1997, Ernst et al. 1998, Sekino et al. 2003), the aim of the present study was to investigate the clinical and microbiological effects of the combination of SRP and

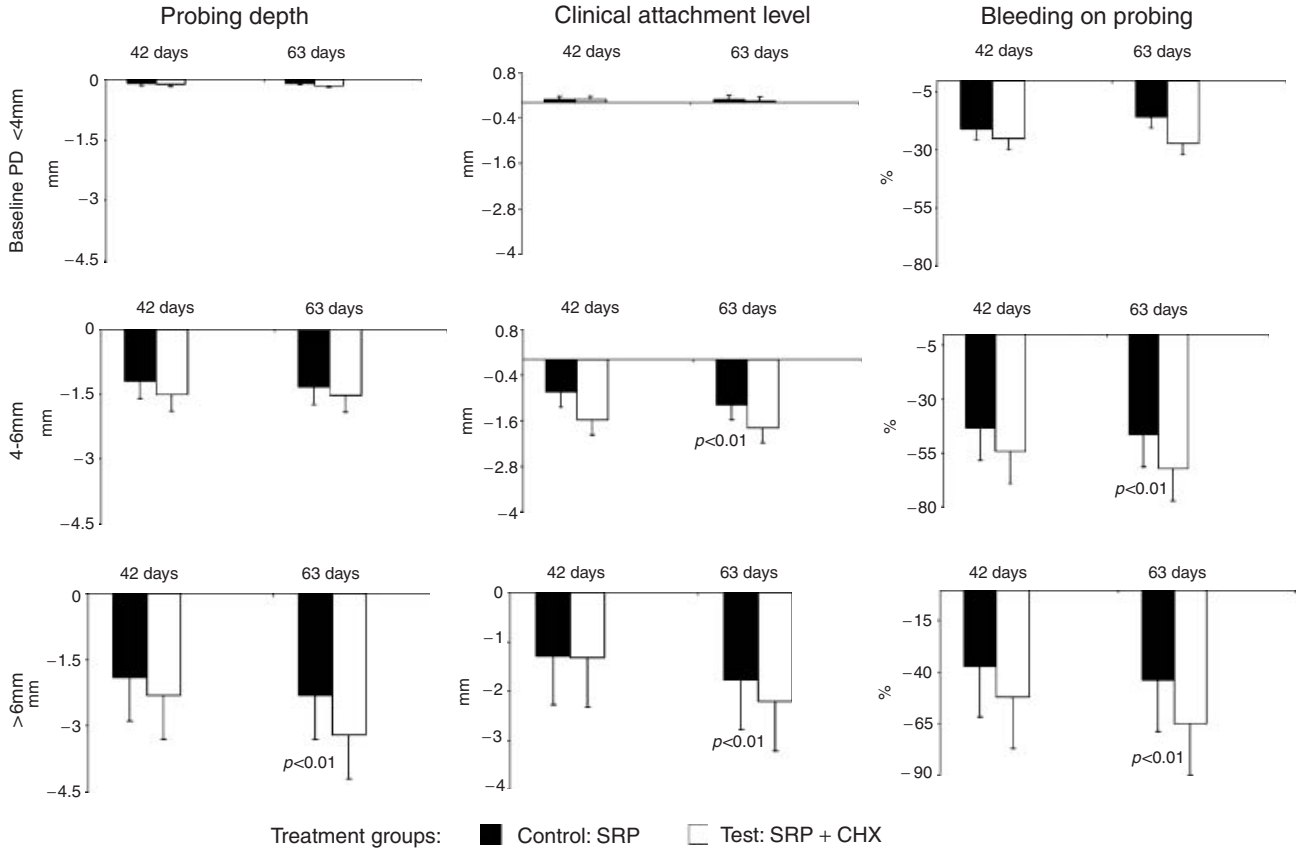

Fig. 6. Bar charts of the mean changes in mean probing depth (PD), mean clinical attachment level and % of sites with bleeding on probing at sites with baseline of <4, 4–6 and >6 mm. The whiskers represent the SD. Significance of differences between treatment groups for each parameter was testing using Mann–Whitney *U*-test.

Table 2. Frequency of distribution of the BANA test score in the control (SRP) and test (SRP+CHX) group during experimental design

	BANA	Control (SRP) $n = 90$ sites/ 15 subjects	Test (SRP+CHX) $n = 84$ sites/14 subjects	*p*-value
Baseline	0	0	2	
	1	17	13	>0.05
	2	73	69	
	0	40	58	
After SRP	1	43	24	<0.05
	2	7	2	
	0	29	56	
42 days	1	48	20	<0.05
	2	13	8	
	0	25	58	
63 days	1	49	20	<0.05
	2	16	6	

Significant differences between treatment groups at baseline, after SRP, 42 days and 63 days post-therapy (χ^2 test). BANA 2, dark blue spots (positive); BANA 1, weak, light blue spots (positive); BANA 0, no colour change (negative); SRP, scaling and root planing; CHX, chlorhexidine 0.12%.

CHX rinsing in subjects with chronic periodontitis.

Both therapies led to a significant reduction in the mean full-mouth PD and CAL up to 63 days post-therapy as well as in the percentage of sites exhibiting plaque, gingival bleeding, suppuration and BOP (Fig. 2). These results were in accordance with other studies that described the positive clinical results of SRP (Morrison et al. 1980, Badersten et al. 1981, Lindhe et al. 1983, Pihlstrom et al. 1983, Ramfjord et al. 1987, Kaldahl et al. 1993, Haffajee et al. 1997, Colombo et al. 2005). The subjects who received the combined therapy (SRP plus CHX rinses), however, showed the greatest improvement in clinical parameters at 42 and 63 days post-therapy compared with those who received SRP alone. When the sites were subset according to baseline PD (Figs 3–6) into shallow (<4 mm), intermediate (4–6 mm) and deep (>6 mm), it was observed that the two therapies produced an increase in the mean CAL in the baseline shallow PD category. These data are in agreement with previous studies that showed that shallow pockets tend to lose attachment after SRP (Hill et al. 1981, Pihlstrom et al. 1981, Lindhe et al. 1982, Cobb 2002, Carvalho et al. 2004). Subjects from the combined therapy group exhibited the greatest reduction in the percentage sites with plaque in all pocket depth categories. These results are in agreement with studies that confirm the efficiency of CHX rinses in controling supragingival plaque formation (Addy

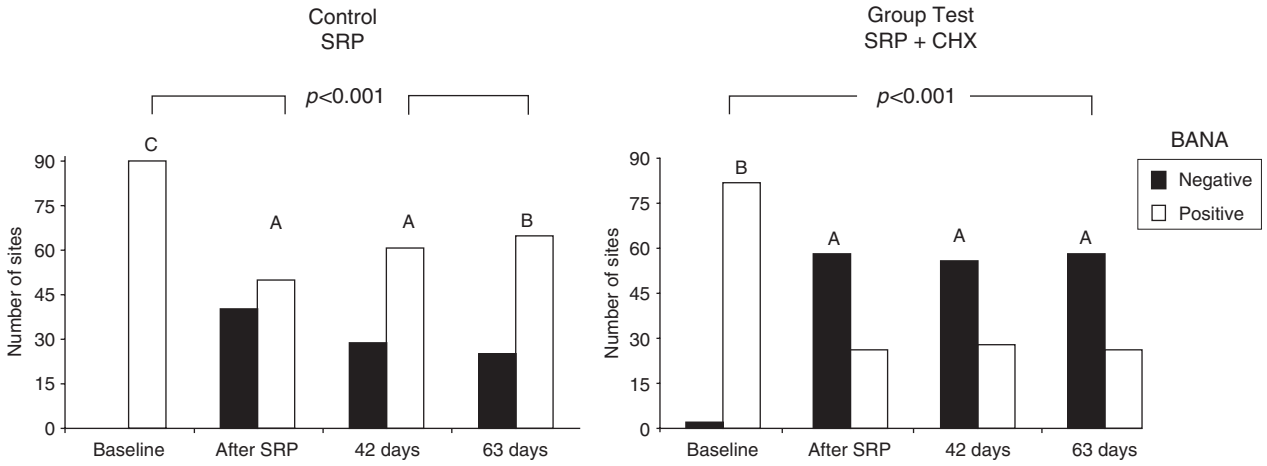

Fig. 7. Bar charts of the frequency of *N*-benzoyl-DL-arginine-2-naphthylamide (BANA) results at baseline, after scaling and root planing (SRP), 42 and 63 days post-therapy in the two treatment groups (control and test). Significance of difference over time within the group was tested using *Q* Cochran's *e* McNemar χ^2 test. Different letters next to bar charts indicate statistically significant differences in the distribution of BANA results during experimental design.

& Moran 1983, Gjermo 1989, Marsh 1992, Albandar et al. 1994, Eaton et al. 1997, Ernst et al. 1998, Sekino et al. 2003). The benefit of the combined therapy was especially noted in the initially intermediate and deep sites, which showed the greatest mean reductions in PD, CAL and in the percentage of sites with BOP up to 63 days post-therapy (Fig. 6). Christie et al. (1998) also observed that the combination of CHX and SRP could improve the clinical outcomes of SRP in all PD categories. However, their study did not present a control group, and CHX rinse was used for 12 months after the end of the mechanical therapy.

The BANA test has been successfully used in several clinical trials to evaluate changes in the subgingival microbiota after therapy (Loesche et al. 1993, Grisi et al. 2002, Loesche et al. 2005, Mascarenhas et al. 2005). This diagnostic technique detects the presence of arginine hydrolase, an enzyme produced by *P. gingivalis*, *T. denticola* and *T. forsythia*, three anaerobic species consistently associated with periodontal infections (Loesche et al. 1990, 2005, Socransky et al. 1998, Ximenez-Fyvie et al. 2000b). Other species are known to be BANA positive, such as *Rothia dentocariosa*, *Rothia mucilaginous* and some *Capnocytophaga* species. However, these microorganisms have not been associated with periodontal disease (Loesche et al. 2005).

Both treatment groups showed a post-therapy reduction in the frequency of the anaerobic microorganisms detected by the BANA test. However, an additional microbiological benefit was observed in the group that rinsed with chlorexidine (Table 2 and Fig. 7). It was interesting to observe that these subjects showed a greater reduction in the percentage of BANA-positive sites, a greater increase in the % of BANA-negative sites, and these results were better sustained up to 63 days in comparison with the control group (Fig. 7). The few studies that evaluated the microbiological effects of CHX rinsing as part of periodontal therapy used the full-mouth disinfection protocol (Quirynen et al. 1995, Bollen et al. 1996) and also noted a microbial benefit with the use of this antiseptic. The findings of the present investigation are also in agreement with other studies that demonstrated that repeated professional supragingival plaque control once a week up to 3 months after SRP could improve the clinical and microbiological results of SRP (Ximénez-Fyvie et al. 2000a, Haffajee et al. 2003, Carvalho et al. 2004, 2005). If it is confirmed that CHX rinsing and repeated professional plaque removal have equivalent therapeutic benefits, the use of CHX offers the great advantage of not requiring the patient's presence in the dental office.

The better clinical and microbiological effects observed with the combination of SRP and CHX in this study might be attributed to a beneficial effect of CHX rinsing on subgingival microbial recolonization. Maintaining low levels of supragingival plaque and disturbing periodontal pathogen reservoirs that are not reached by SRP, such as tonsils, tongue, saliva and oral mucous membranes (Dahlen et al. 1989, Cao et al. 1990, Colombo et al. 1998), could have a positive influence on recolonization of the recently scaled pockets. Other studies evaluating a larger number of microorganisms for longer periods of time will, however, be crucial in order to determine whether this combination of therapies would produce sustained beneficial changes in the subgingival microbial profile and in periodontal clinical parameters over time.

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Address:
Luciene Cristina de Figueiredo
Universidade Guarulhos
Centro de Pós-Graduação
Pesquisa e Extensão-CEPPE
Praça Tereza Cristina, 01 - Centro
07023-070 Guarulhos, SP
Brazil
E-mail: lfigueiredo@ung.br

Clinical Relevance

Scientific rationale for study: Professional supragingival plaque removal during and right after SRP enhances the clinical and microbiological effects of this procedure. Therefore, it was hypothesized that CHX mouthrinses, a more practical way to prevent plaque formation, could have this same beneficial effect.

Principal findings: Subjects receiving the combination of SRP and CHX rinsing showed a significant improvement in clinical parameters and a greater reduction in pathogens compared with SRP alone.

Practical implication: CHX rinsing during and immediately after SRP improves the effect of this therapy in subjects with chronic periodontitis.