Clinical and Microbiological Evaluation of Povidone-Iodine 10% as an Adjunct to Nonsurgical Periodontal Therapy in Chronic Periodontitis: A Randomized Clinical Trial

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Abstract

Aim: To evaluate the clinical and microbiological effects of irrigation with 10% povidone-iodine (PVP-I) as an adjunct to scaling and root planing (SRP) in the treatment of chronic periodontitis (ChP).

Methods: Thirty-six subjects with ChP were randomly assigned to receive SRP + irrigation with saline solution (control group) or SRP + irrigation with 10% PVP-I (test group). Subjects received clinical and microbiological evaluation at baseline, 30 and 90 days post-treatment. Six subgingival plaque samples/subject were collected at each time point and individually analyzed for 40 bacterial species by checkerboard DNA-DNA hybridization.

Results: No statistically significant differences were observed between the two groups at 90 days post-treatment. At 30 days, the test group presented with lower levels of *Tannerella forsythia* and lower proportions of red complex pathogens in comparison to the control group. However, these benefits were not maintained at 90 days.

Conclusion: The results of this study were unable to show a significant clinical benefit from the adjunctive use of 10% PVP-I in the treatment of chronic periodontitis. However, the microbiological benefit observed with the use of this substance at 30 days might indicate a role for PVP-I in periodontal care, possibly through its repeated application during supportive therapy.

Key words: Periodontal therapy, chronic periodontitis, clinical trial, microbiology, DNA probe, periodontal disease

Introduction

Over the years, scaling and root planing (SRP) has been shown to be effective in the treatment of periodontal diseases (Axelsson and Lindhe, 1978; Badersten *et al.*, 1981; Greenstein, 1992). However, longitudinal studies have demonstrated the occurrence of recurrent or refractory disease in some patients, even those receiving supportive treatment (Lang *et al.*, 1996). In most cases, this is due to

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the fact that mechanical treatment *per se* does not seem to be as effective in the complete elimination of the main periodontal pathogens at some sites, especially in deep pockets and areas of difficult access (Renvert *et al.*, 1990; Cugini *et al.*, 2000; Serino *et al.*, 2001). In addition, the ability of various pathogens to invade periodontal tissues and dentinal tubules may contribute to the recolonization of the treated periodontal sites (Adriaens *et al.*, 1988).

The persistence of certain microorganisms such as *Aggregatibacter actinomycetemcomitans*, *Fusobacterium nucleatum*, *Prevotella intermedia* and mainly red complex bacteria, including *Porphyromonas gingivalis*, *Tannerella forsythia* and *Treponema denticola*, in deep pockets even after mechanical treatment has been indicated as a risk factor for re-infection of these sites (Haffajee *et al.*, 1997; Chaves *et al.*, 2000; Mombelli *et al.*, 2004). These findings have supported the local and systemic administration of antimicrobial agents as adjuncts to mechanical treatments in order to suppress or reduce the levels of pathogens and, therefore, provide additional benefits to conventional therapy.

Local and systemic antimicrobials/antibiotics are effective adjuncts in the treatment of periodontitis (Feres *et al.,* 2015a; Sgolastra *et al.,* 2012a, 2012b; Zandbergen *et al.,* 2013; Matesanz-Perez *et al.,* 2013). Sustained release of these agents allows delivery of high concentrations of the medication at specific sites, and minimizes problems associated with the use of systemic drugs, such as side effects and the development of bacterial resistance (Etienne, 2003; Mombelli and Samaranayake, 2004; Jorgensen *et al.*, 2005; Tonetti *et al.*, 2012).

Povidone-iodine (polyvinylpyrrolidone-iodine; PVP-I) is an antimicrobial agent with good bactericidal activity and is widely used in medicine, especially in surgery and gynecology (König *et al.*, 1997; Schreier *et al.*, 1997). The main advantages of PVP-I are its low systemic toxicity, ease of application, and low cost (Kunisada *et al.*, 1997; Lanker-Klossner *et al.*, 1997; Slots, 2012). In addition, it presents a broad spectrum of action and is associated with few adverse reactions at the concentrations normally used in medicine and dentistry (9 to 12%) (Maruniak *et al.*, 1992; Nakagawa *et al.*, 2006; Hosaka *et al.*, 2012).

In periodontics, the use of PVP-I as an adjunct to mechanical treatment has shown controversial results (Greenstein, 1999; Greenstein (AAP), 2005; Rosling *et al.*, 2001; Leonhardt *et al.*, 2006; Ribeiro *et al.*, 2006; Zanata *et al.*, 2006; Sahrmann *et al.*, 2010, 2014; Krück *et al.*, 2012; Feres *et al.* 2015b). Sahrmann *et al.* (2014) showed that PVP-I applied frequently during SRP might enhance probing depth (PD) reduction in initially deep pockets. Rosling *et al.,* (2001) observed that the use of PVP-I in combination with ultrasonic instrumentation improved the results of mechanical treatment of non-molar teeth, which showed greater attachment gain than those in the control group after 13 years of follow-up. Hoang *et al.* (2003) reported a reduction in the total bacterial counts after SRP and irrigation with PVP-I compared with SRP alone after 5 weeks of follow-up. However, other authors have shown little or no additional benefits resulting from the adjunctive use of PVP-I when compared with SRP alone (Leonhardt *et al.*, 2006; Ribeiro *et al.*, 2006; Zanata *et al.*, 2006; Krück *et al.*, 2012). In addition, although Krück *et al.* (2012) evaluated the effect of PVP-1 in four different bacterial species, to our knowledge no previous studies have comprehensively evaluated the effects of PVP-I on the subgingival microbial profile.

Therefore, the aim of the present study was to determine the effects of the adjunctive use of subgingival irrigation with 10% PVP-I on clinical parameters and on the levels of 40 bacterial species of subjects with chronic periodontitis (ChP).

Material and methods

Sample size calculation

The ideal sample size to assure adequate power for this clinical trial was calculated considering differences of at least 1 mm between groups for clinical attachment level (CAL) gain in pockets with initial PD ≥ 7 mm, and assuming a standard deviation of 1.0 mm (Matarazzo *et al.,* 2008). Based on these calculations, 16 subjects per group was defined as the number necessary to provide an 80% power with an alpha of 0.05. Considering an attrition rate of about 10%, it was established that 18 subjects should be included in each treatment group.

Subject population/ inclusion and exclusion criteria

Thirty-six subjects with a diagnosis of ChP were selected among those seeking dental treatment at São José dos Campos Dental School. Complete periodontal examination was performed, including intraoral evaluation, periodontal probing, and application of a questionnaire regarding medical and dental history. The subjects who fulfilled the inclusion criteria were invited to participate. All individuals who agreed to participate were informed about the nature and potential risks and benefits of the study and signed a term of free informed consent. The study was approved by the Ethics Committee of the São José dos Campos Dental School, and was in full accordance with the World Medical Association Declaration of Helsinki.

The study included subjects older than 30 years, with at least 20 teeth, who presented with a minimum of six teeth, preferably in different quadrants, that had at least one site each with probing PD and CAL ≥ 5 mm. Exclusion criteria were systemic diseases or antibiotic prophylaxis that could affect the progression of periodontal disease, periodontal treatment during the last 6 months prior to the study, smoking, pregnancy or breast-feeding, antibiotic therapy during the last 6 months prior to the study, iodine allergy, thyroid dysfunction, and regular use of steroidal and nonsteroidal anti-inflammatory drugs.

Experimental design and treatment procedures

Using simple randomization and a 1:1 allocation system, the study coordinator (J.B.O.A) used a computer-generated table to randomly assign the subjects to the following two groups: 1) Control (SRP-S): SRP + irrigation with saline solution, and 2) Test (SRP-I): SRP + irrigation with 10% PVP-I.

Initially, all subjects received supragingival scaling and prophylaxis, and oral hygiene instructions. Teeth indicated for extraction were removed during this phase. The subjects were instructed to use the same toothpaste containing triclosan/gantrez (Colgate Total®, Colgate Palmolive Co., São Bernardo do Campo, Brazil) and not to use any oral antiseptic solution during the study period. In addition, the participants were offered soft and single-tuft interdental toothbrushes. After this phase, the subjects were submitted to clinical monitoring and subgingival biofilm collection, followed by SRP, which was performed under local anesthesia (3% prilocaine) using hand-held instruments (Gracey curettes) until a smooth root surface was obtained according to the criterion of the operator. Each patient underwent an average of 4 - 6 sessions (approximate duration of 1 h and 30 min) over a maximum period of 14 days.

Disposable syringes (5 cc) and closed-tip cannulas (0.5 mm in diameter) were used for subgingival irrigation. The six sites of all teeth were irrigated immediately after the SRP procedure. Approximately 5 ml 10% PVP-I (Bio Trat®, LM Farma, São José dos Campos, Brazil) or saline solution was applied slowly to each tooth to reach the full extent of the pockets and to allow the substance to remain at the site for a longer period of time. The minimum time the substance was left inside the pockets was 5 min. During this period, a high-power suction apparatus was placed close to the gingival margin to minimize swallowing of the substance (Hoang *et al.*, 2003).

At 30 days post-SRP all subjects underwent dental prophylaxis and biofilm sampling. At 90 days post-SRP the microbiological samples were again collected from the same six sites, and all subjects received clinical monitoring, oral hygiene instructions, and supra- and subgingival scaling.

A single experienced operator performed the mechanical treatment and subgingival irrigation in all subjects (F.A.P.). Another researcher performed all clinical measurements (W.D.K.). Participants, operator and examiner were blinded to treatment assignment.

Clinical monitoring

A calibrated examiner performed all clinical examinations. Intra-examiner calibration was conducted by measuring the standard error of measurement after two full-mouth measurements of PD in 10 patients (Araújo *et al.*, 2003). The mean intra-examiner variability was 0.26 mm, which was considered an acceptable level of reproducibility for periodontal parameters (Badersten *et al.,* 1984). The following clinical parameters were evaluated: plaque index (0/1; absent/present), bleeding on probing (0/1), suppuration (0/1), PD (mm), and CAL (mm). Six sites per tooth (mesiobuccal, buccal, distobuccal, mesiolingual, lingual, and distolingual) were analyzed, except for the third molars. Pocket depth and CAL were measured to the nearest millimeter using a standard periodontal probe (Hu-Friedy, Chicago, IL, USA).

Microbiological monitoring

Six subgingival plaque samples [three in each of the following categories: intermediate (PD 4 - 6 mm) and deep (PD 7 - 9 mm)] were collected per subject at baseline, from noncontiguous interproximal sites. After 30 and 90 days post-therapy, samples were collected from the same sites. In the cases of subjects who did not present with three deep sites, plaque samples were collected from the intermediate pockets, until six sites per patient were obtained. After the clinical parameters had been recorded, the supragingival plaque was removed and the subgingival samples were taken with individual sterile mini-Gracey curettes (#5–6) and placed in separate Eppendorf tubes containing 0.15 mL of TE (10 mM Tris-HCl, 1 mM EDTA, pH 7.6) solution. One hundred microliters of 0.5 M NaOH were added to each tube and the samples were dispersed using a vortex mixer. The samples were individually analyzed for counts of 40 bacterial species using the checkerboard DNA-DNA hybridization technique (Socransky *et al.*, 1994; Mestnik *et al.,* 2010) in the Laboratory of Microbiology of Guarulhos University. In total, 576 samples were evaluated.

Primary and secondary outcome variables

The primary outcome variable was the difference between groups for the mean changes in CAL in sites with initial PD ≥ 7 mm at 90 days post-therapy. Secondary outcome variables were differences between groups for the following parameters after treatment: changes in CAL in sites with initial PD 4 - 6 mm, changes in PD in sites with initial PD 4 - 6 mm and ≥ 7 mm, mean full mouth PD and CAL, percentage of sites with bleeding on probing (BOP), plaque accumulation, gingival bleeding and suppuration, levels of the 40 bacterial species evaluated and proportions of the microbial complexes.

Statistical analysis

Mean clinical parameters were computed for each subject and then for each group, using the patient as the sample unit. Intra- and intergroup differences in PD and CAL at the different experimental times were evaluated by Student's *t*-test. Analysis of variance (ANOVA) was used to compare plaque and gingival indices, BOP, suppuration and age.

The microbiological data were expressed as the mean counts and proportions of each species evaluated. These results were computed per subject and per treatment group at each time point. Differences in the mean counts or proportions of microorganisms within each group over time were evaluated by the Friedman test. The Wilcoxon test was used to determine differences in mean counts or proportions of microorganisms within each group between two experimental times. Differences in counts or proportions of different microbial species or microbial complexes between the two treatment groups at each experimental time were evaluated by the Mann-Whitney U test. A level of significance of 5% was adopted for all tests.

Results

Subject retention, adverse effects and compliance

Thirty-six subjects were initially selected for the study. Of these, seven were excluded: five because they did not attend one of the follow-up visits (three in the test group and two in the control group), and two because they had taken antibiotics for medical reasons (one in the test group and one in the control group). Thus, data from 29 subjects were analyzed (15 in the control group and 14 in the test group), corresponding to 675 teeth and 3050 sites. None of the subjects reported any side effects associated with the substances used. A flow chart of the study design is presented in *Figure 1*.

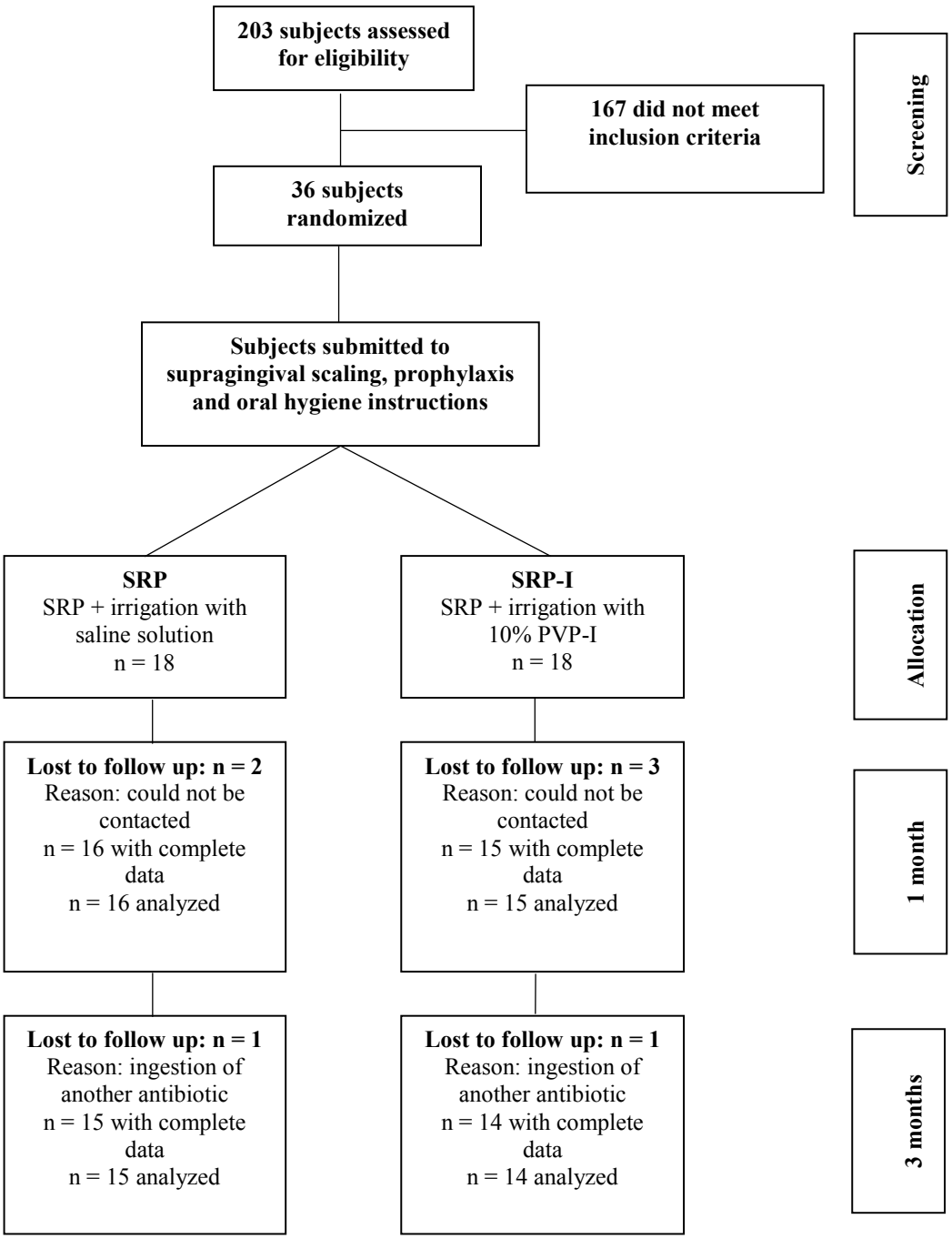

Figure 1. Flow chart of the study design. SRP, scaling and root planing; PVP-I, 10% povidone-iodine.

Clinical outcomes

The epidemiological characteristics and mean clinical parameters observed in the SRP-I group (n = 14) and SRP-S group (n = 15) at baseline and after 90 days are shown in *Table 1*. No statistically significant differences were observed between groups for any parameter evaluated at baseline ($p > 0.05$). Both treatments led to a significant improvement in all clinical parameters, except for the mean CAL in the SRP-S group. *Table 2* shows the changes in mean PD and CAL between baseline and 90 days post-therapy at initially moderate (PD 4 - 6 mm) and deep pockets (≥ 7 mm). Both treatments were equally effective in improving these two parameters in both pocket categories.

Microbiological outcomes

The species were grouped according to the microbial complexes described by Socransky *et al.* (1998). Microbial counts in moderate pockets (PD 4 - 6 mm) are shown in *Figures 2* and *3*. A statistically significant reduction in red complex species (*P. gingivalis*, *T. denticola* and *T. forsythia*) was observed after 30 and 90 days in both groups. With respect to the orange complex, a significant reduction in counts of four species (*Eubacterium nodatum, Campylobacter showae*, *P. intermedia*, and *Prevotella nigrescens*) was observed in the SRP-S group, and of seven species (*Campylobacter showae*, *Eubacterium nodatum*, *Fusobacterium nucleatum ssp. vicentii*, *Fusobacterium periodonticum*, *Micromonas micros*, *P. intermedia*, and *P. nigrescens*) in the PVP-I group. No statistically significant differences between the two groups were observed at each time point, except for the higher level of *P. intermedia* in the SRP-S group at baseline ($p > 0.05$).

Table 1. Demographic characteristics and mean (± SD) full-mouth clinical parameters at baseline and 90 days post-therapy.

Variable	Time point	Treatment groups	
		SRP-S (n = 15)	SRP-I (n = 14)
Gender (male/female)	Baseline	7/8	5/9
Age (years)	Baseline	44.87 ± 4.41	43.93 ± 3.13
Number of sites	Baseline	2064	1986
Number (%) sites with			
PD ≤ 3 mm	Baseline	1231 (59.64%)	1047 (52.71%)
PD 4-6 mm	Baseline	615 (29.79%)	682 (34.34%)
PD ≥ 7 mm	Baseline	218 (10.56%)	257 (12.94%)
PD (mm)	Baseline	3.60 ± 0.71	3.82 ± 0.66
	90 days	2.42 ± 0.32 *	2.42 ± 0.31 *
CAL (mm)	Baseline	4.17 ± 0.96	4.35 ± 1.09
	90 days	3.93 ± 0.80	3.88 ± 1.14 *
% of sites with			
Plaque accumulation	Baseline	71.28 ± 20.87	72.46 ± 21.55
	90 days	25.05 ± 19.09 *	17.90 ± 12.25 *
Bleeding on probing	Baseline	82.71 ± 18.01	88.59 ± 14.15
	90 days	35.02 ± 14.41*	35.15 ± 15.64*
Suppuration	Baseline	4.98 ± 5.73	4.49 ± 3.94
	90 days	0.51 ± 0.91*	0.25 ± 0.51*

The significance of differences between baseline and 90 days post-therapy was assessed using Student's *t*-test and ANOVA (*$p < 0.05$). SRP-S: scaling and root planing and irrigation with 0.9% NaCl; SRP-I: scaling and root planing and irrigation with 10% PVP-I. PD, probing depth; CAL, clinical attachment level; SD, standard deviation

Table 2. Mean PD reduction and CAL gain (± SD) between baseline and 3 months post-therapy.

			Treatment groups		
Baseline PD	**Variable**	**Time point**	**SRP-S**	**SRP-I**	**Student's *t*-test**
			n = 15	n = 14	*p* value
PD 4 - 6 mm	PD reduction	0-90 days	1.94 ± 0.36 mm	2.06 ± 0.33 mm	$p > 0.05$
	CAL gain		0.87 ± 0.44 mm	0.93 ± 0.55 mm	$p > 0.05$
PD ≥ 7 mm	PD reduction	0-90 days	3.37 ± 0.85 mm	3.41 ± 0.66 mm	$p > 0.05$
	CAL gain		1.70 ± 1.16 mm	2.13 ± 0.76 mm	$p > 0.05$

SRP-S, scaling and root planing and irrigation with 0.9% NaCl; SRP-I, scaling and root planing and irrigation with 10% povidone-iodine. PD, probing depth; CAL, clinical attachment level; SD, standard deviation

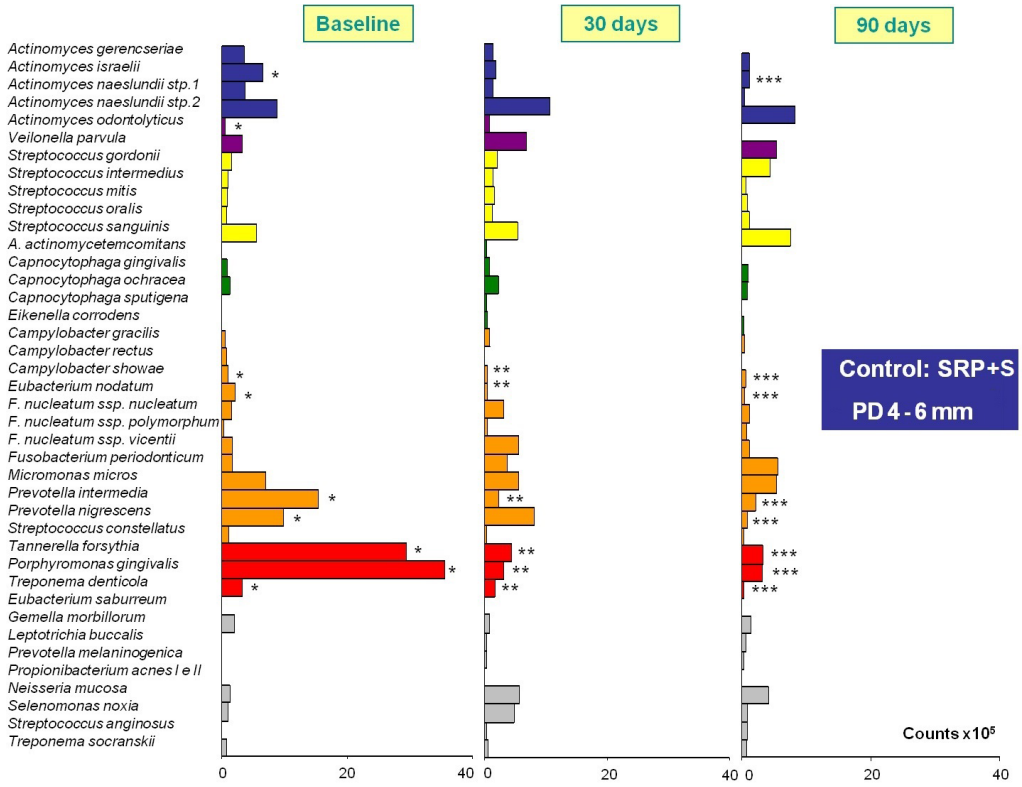

Figure 2: Lateral bar chart illustrating the mean counts of 40 species from subgingival plaque samples in moderate sites prior to 30 and 90 days after treatment in the SRP-S group. *Significant differences over the course of the study (p < 0.05, Friedman test); **significant differences between baseline and 30 days (p < 0.05, Wilcoxon test); ***significant differences between baseline and 90 days (p < 0.05, Wilcoxon test).

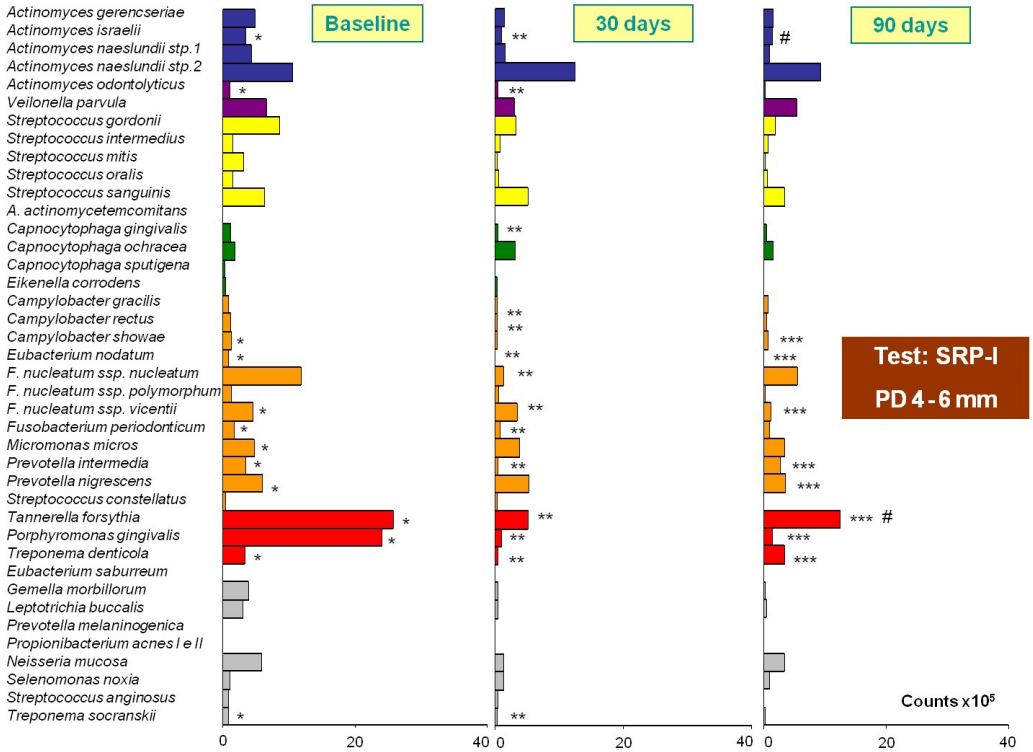

Figure 3: Lateral bar chart illustrating the mean counts of 40 species from subgingival plaque samples in moderate sites prior to 30 and 90 days after treatment in the SRP-I group. *Significant differences over the course of the study (p < 0.05, Friedman test); **significant differences between baseline and 30 days (p < 0.05, Wilcoxon test); ***significant differences between baseline and 90 days (p < 0.05, Wilcoxon test); #significant differences between 30 and 90 days (p < 0.05, Wilcoxon test).

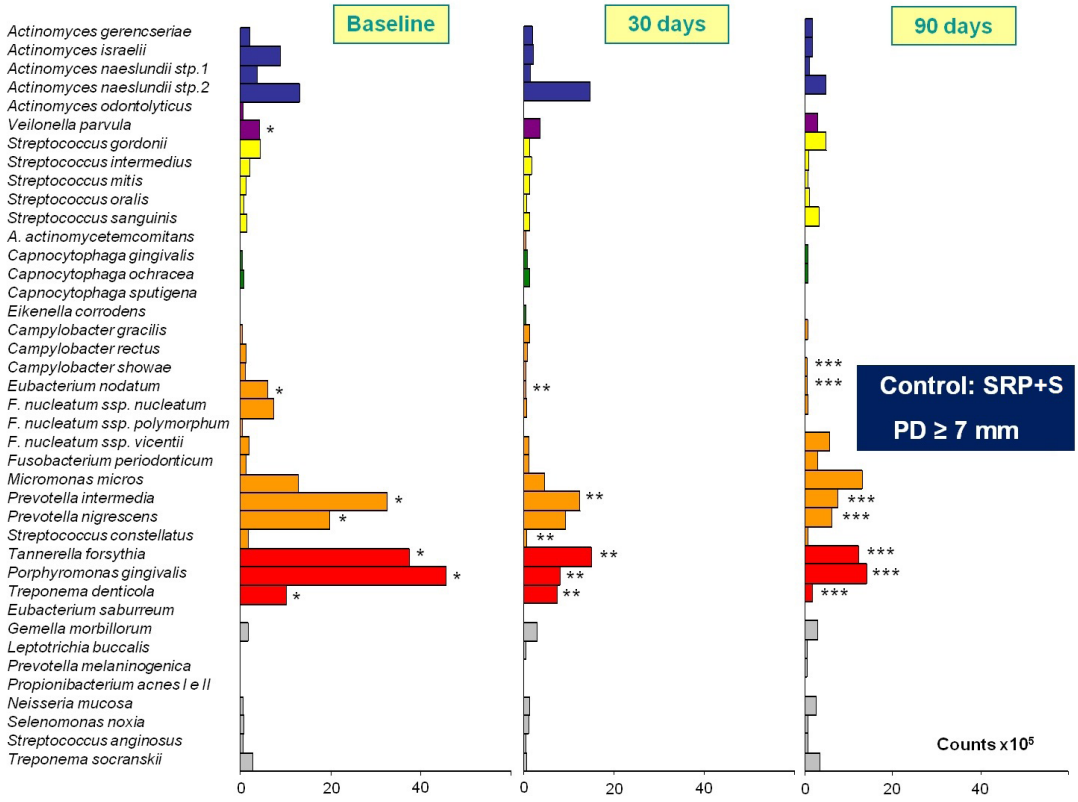

Figure 4: Lateral bar chart illustrating the mean counts of 40 species from subgingival plaque samples in initially deep sites prior to 30 and 90 days after treatment in the SRP-S group. *Significant differences over the course of the study (p < 0.05, Friedman test); **significant differences between baseline and 30 days (p < 0.05, Wilcoxon test); ***significant differences between baseline and 90 days (p < 0.05, Wilcoxon test).

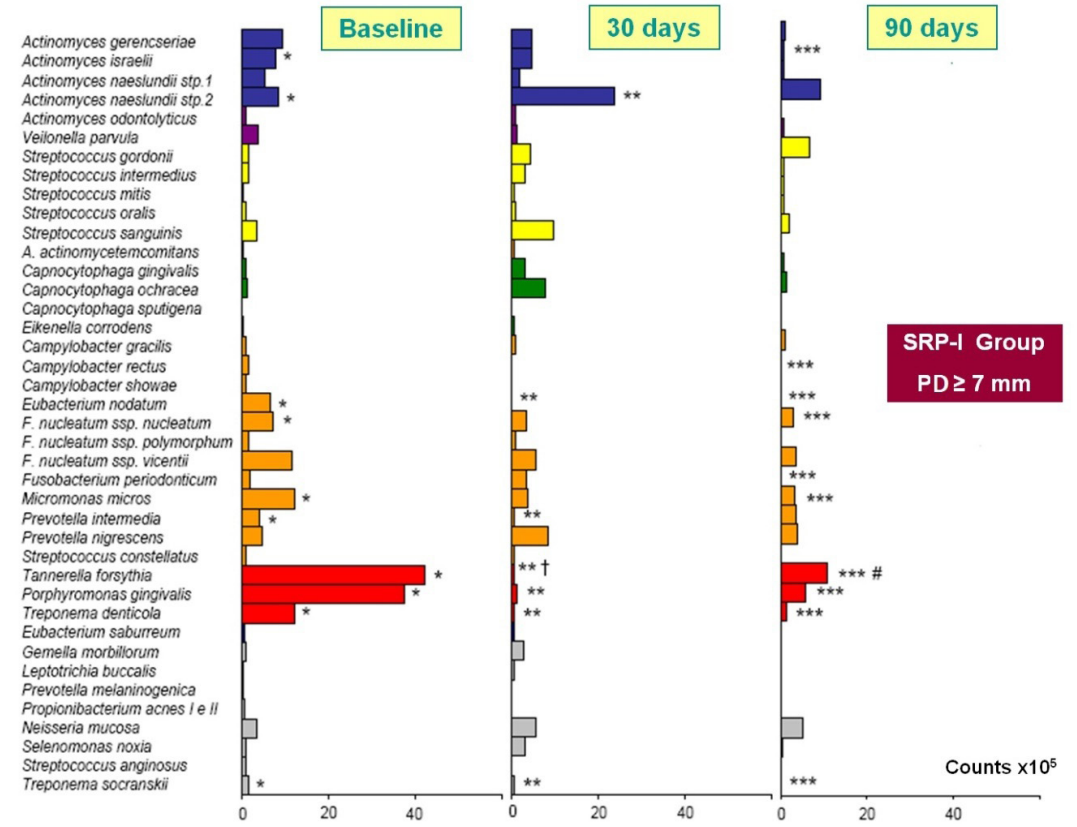

Figure 5: Lateral bar chart illustrating the mean counts of the 40 bacterial species evaluated from initially deep pockets at baseline, 30 and 90 days post-treatment in the SRP-I group. *Significant differences over the course of the study (p < 0.05, Friedman test); **significant differences between baseline and 30 days (p < 0.05, Wilcoxon test); ***significant differences between baseline and 90 days (p < 0.05, Wilcoxon test); #significant differences between 30 and 90 days (p < 0.05, Wilcoxon test). †: differences between the two groups. (p < 0.05, Mann Whitney U test).

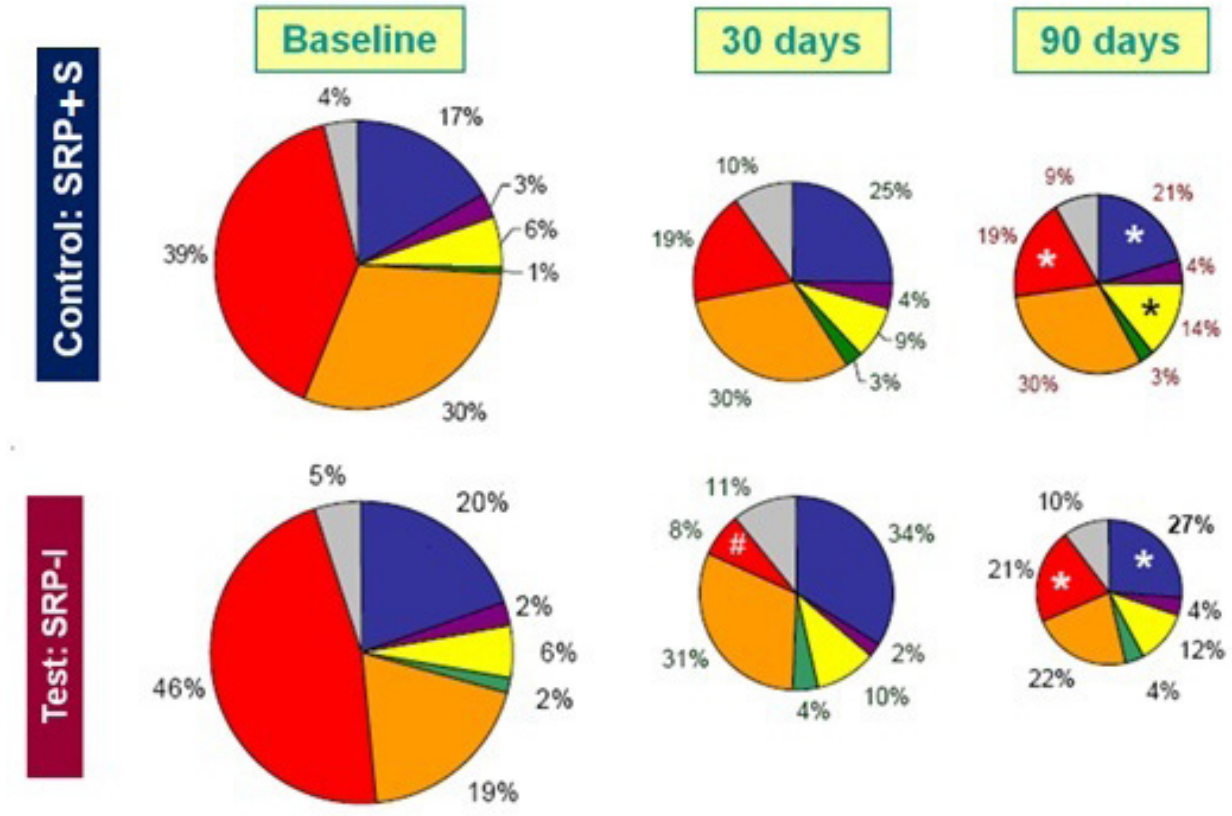

Figure 6: Pie charts of the mean proportions of microbial complexes present in subgingival plaque samples of subjects in the two treatment groups at baseline, 30 and 90 days post-treatment. The area of the graphic was adjusted to reflect the difference between the total counts at baseline and the other two time points *Significant differences over the course of the study ($p < 0.05$, Friedman test); #significant differences between the two groups at each time point ($p < 0.05$, Mann Whitney U test).

The counts of most species of the purple, yellow, blue and green complexes, as well as the *Actinomyces* species, were only slightly affected by the different treatments.

Figures 4 and *5* present the microbial counts in initially deep pockets (≥ 7 mm) over the course of the study. Red complex species (mainly *P. gingivalis* and *T. forsythia*) were the most numerous bacteria at baseline in the two groups, followed by some members of the orange complex. A statistically significant reduction in the counts of the three red complex pathogens was observed at 30 days in the two groups. However, at 30 days post-treatment, the test group presented statistically significantly lower levels of *T. forsythia* (41×10^5, corresponding to 98% reduction in comparison with the baseline counts) than the control group (22×10^5, corresponding to 60% reduction in comparison with the baseline counts). No statistically significant differences in red complex species counts were observed between groups at 90 days.

The two treatments led to a reduction in the counts of the orange complex species. Statistically significant differences were observed between baseline and 90 days for three species in the SRP-S group (*P. intermedia*, *E. nodatum*, and *Streptococcus constellatus*) and two species in the SRP-I group (*E. nodatum* and *P. intermedia*); and between baseline and 90 days for four species in the SRP-S group (*P. intermedia*, *E. nodatum*, *C. showae*, and *P. nigrescens)* and seven species in the SRP-I group (*E. nodatum*, *P. intermedia*, *Campylobacter rectus*, *F. nucleatum stp. nucleatum*, *F. periodonticum*, and *P. micra*).

Figure 6 shows the changes in the proportions of the microbial complexes during the study period according to the treatment group. The proportion of each complex was calculated as the sum of proportions of the corresponding species at each time point evaluated. The red complex species were those in highest proportion in the two groups at baseline (39% in the SRP-S group and 46% in the SRP-I group), followed by the orange complex (30% in the SRP-S group and 19% in the SRP-I group). In general, the two treatments led to beneficial changes in the microbial composition. At 30 days, SRP-I treatment reduced the proportion of the red complex by 38% versus 20% in the SRP-S group, and the remaining proportions of this complex were higher in the control (19%) than in the test group (8%) at this time point ($p > 0.05$). At 90 days post-treatment similar proportions of the red complex were observed in the two groups (19% in the SRP-S group and 21% in the SRP-I group). The proportions of the complexes comprising beneficial species (blue, purple, yellow, and green) increased after the two treatments, with the difference being statistically significant only for the *Actinomyces* species.

Discussion

The results of the present study showed no statistically significant differences between the clinical improvements observed in subjects with chronic periodontitis treated by means of SRP-only or combined with 10% PVP-I. At 90 days, the clinical improvements observed in both groups were compatible with the results of studies that investigated the effects of non-surgical periodontal therapy (Badersten *et al*., 1981, 1984; Lindhe *et al*., 1982; Westfelt *et al*., 1985; Drisko, 2001; Claffey *et al*., 2004). However, no statistically significant differences in PD or CAL were observed between the two groups after 90 days.

These results are in agreement with the study of Hoang *et al*. (2003), who also used 10% PVP-I for subgingival irrigation as an adjunct to manual SRP and found no statistically significant differences between the two groups in PD reduction in initially deep pockets. This reduction was 1.80 mm in the test group and 1.60 mm in the control group. The results of these authors were similar to those of the present study, but no direct comparison could be made, since the time of follow-up was only 5 weeks in the above-mentioned study and the number of sites studied was small (16 per group). Other studies were also unable to demonstrate differences in clinical parameters between mechanical instrumentation with and without iodine (Koshy *et al*., 2005; Leonhardt *et al*., 2006; Ribeiro *et al*., 2006; Zanatta *et al*., 2006).

It is important to highlight that the present study showed a small, albeit not statistically significant, difference in favor of the test group for PD reduction and CAL gain at initially moderate and deep sites. Rosling *et al*. (2001) investigated the use of 0.1% PVP-I in ultrasonic devices in 223 subjects with advanced periodontal disease, and showed that this treatment promoted a significantly greater reduction in PD and gain in CAL at 12 months in comparison with a group treated with the ultrasonic device without PVP-I. The differences between the test and control groups in the study of Rosling *et al*. (2001) were very similar to those observed in the present study, although we did not detect statistically significant differences between the two groups. These differences may have been due to the larger sample size in the quoted study, in comparison with the present one. A systematic review (Sahrmann *et al*., 2010) has also indicated small to moderate clinical benefits of the adjunctive use of PVP-I during periodontal treatment.

In a second phase of the study of Rosling *et al*. (2001), the subjects were followed for 12 years and received supportive periodontal treatment, which consisted of re-instrumentation of bleeding sites, using the same protocols as those used during initial therapy. Reduced tooth loss and lower levels of attachment loss were observed in the test group, indicating that multiple applications of PVP-I might be useful to combat re-infection of treated sites.

Both treatments resulted in a significant reduction in the levels of the red complex pathogens and several species of the orange complex, in agreement with previous studies showing that SRP itself is able to reduce these pathogens (Haffajee *et al*., 1997; Cugini *et al*., 2000; Petersilka *et al*., 2002; Krück *et al*., 2012). Although, the adjunctive use of PVP-I did not show an evident benefit on the composition of the subgingival microbiota at 90 days, in the short-term evaluation (30 days post-therapy) the combined protocol was more effective than SRP-only in reducing counts of *T. forsythia* and the proportions of the red complex pathogens. Furthermore, more putative pathogens from the orange complex were reduced over the course of the study in the SRP-I group in comparison with the SRP-S group, especially in initially moderate sites. von Ohle *et al*. (1998) have found that subgingival irrigation with PVP-I alone led to a higher transient reduction of total subgingival bacterial counts than irrigation with chlorhexidine or placebo. Although the short-term microbiological advantages observed in the SRP-I group in the present study did not yield clinical benefits, one could speculate that repeated applications of PVP-I during periodontal treatment or the maintenance phase could lead to further microbiological and clinical benefits.

This study has limitations, such as the short-term follow-up period of 90 days and the small sample size that might have interfered with the statistical significance of the main findings. Moreover, the supragingival scaling conducted before SRP and the prophylaxis at 30 days post-therapy might have interfered with the significant differences between test and control groups. The main strength of the present investigation is to be the first randomized controlled trial to evaluate the microbiological effects of SRP + PVP-I irrigation in periodontal treatment. Therefore, the results presented here may guide future investigations in the field. Taken together, the results of this study were unable to show a statistically significant clinical benefit from the adjunctive use of 10% PVP-I in the treatment of chronic periodontitis. However, the microbiological benefit observed at 30 days with the use of this substance might indicate a role for PVP-I in periodontal care, possibly through its repeated application during supportive therapy.

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