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Review

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Clinical Efficacy of Full-Mouth Ultrasonic Debridement against Partial-Mouth Ultrasonic Debridement in the Treatment of Chronic Periodontitis: Full-*Vs* Partial-Mouth Debridement

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ABSTRACT

Aim: To compare the clinical benefit of full-mouth ultrasonic debridement against partial-mouth ultrasonic debridement in patients with chronic periodontitis up to 3 months after therapy.

Materials and Methods: Sixty patients with probing pocket depth ≥ 5 mm were randomly assigned to evaluate the clinical efficacy of full-mouth ultrasonic debridement against partial-mouth ultrasonic debridement in the treatment of advanced chronic periodontitis.

Results: There was a reduction in the levels of probing pocket depth and relative attachment level but no statistically significant difference between treatment groups in intervals of 30, 60 and 90 days. For bleeding following pocket probing, was found statistical difference for 30 and 60 days, where the groups of full-mouth showed more reduction than conventional therapy. But in 90 days, there was no significant difference between groups.

Conclusion: At the evaluation 90 days after treatment, no statistical difference was found between the two periodontal therapies.

Clinical Relevance: This study tried to verify if full-mouth ultrasonic debridement provides clinically relevant improvements in the periodontal treatment.

KEYWORDS: Chronic periodontitis; Periodontal therapy; Periodontal disease; One-stage full-mouth disinfection.

ABBREVIATIONS: PPD: Probing Pocket Depth; SRP: Scaling Root and Planning; CHX: Chlorhexidine; OHI: Oral Hygiene Instruction.

INTRODUCTION

Chronic periodontitis is the most common form of periodontitis with about 80% of prevalence.[1-3] The periodontal disease is an opportunistic infection associated with the formation of bacterial bio films on the tooth surfaces. This etiological factor acts through direct mechanisms: destruction caused by lytic enzymes and cytotoxins produced by bacteria, and indirect: periodontal destruction by the inflammation.[4]

The bio film is considered the primary agent in the aetiology of periodontitis. However, only the bio film is not enough to determine the disease, genetic and host (eg, oral hygiene

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stress, diabetes, and smoking) may also be present.[5] periodontal infections have a multi factorial aetiology involving a susceptible host and the presence of periodontal pathogens.[6]

The chronic periodontitis has slowly progression and it can be classified in relation to the length (number of sites involved), as localized or generalized, and the severity (amount of insertion loss), as light, moderate and severe.[5-7]

The treatment aims to accomplish the removal of dental calculus and cement contaminated with toxins or microorganisms.[3] The scraping conventional instrumentation is performed by mechanical sextants or quadrants at intervals of one to two weeks, so that active treatment is complete in four to six weeks. In the periodontal therapy in a single session (full-mouth disinfection), a new approach suggested for the treatment of periodontal infections, Quirynen, et al.[8] proposed a model of disinfection treatment in one session performing Scaling Root and Planning (SRP) within 24 hours, supplemented with the use of Chlorhexidine (CHX) for two weeks. The dental calculus and cement contaminated can be removed by manual or ultrasonic debridement, and the studies show similar effectiveness in both approaches.[9-10] In a clinical evaluation for six months to evaluate manual and ultrasonic debridement the results were similar.[11] Other study demonstrated that a single session of full-mouth plus ultrasonic is a justified initial treatment approach that offers tangible benefits for the chronic periodontitis patient.[12]

So, the present study compared the clinical benefit of full-mouth ultrasonic debridement against partial-mouth ultrasonic debridement in patients with chronic periodontitis up to 3 months after therapy. This study tried to verify if full-mouth ultrasonic debridement provides clinically relevant improvements in the periodontal treatment.

MATERIALS AND METHODS

Selection of patients

This study had voluntary participants that according to inclusion criteria were patients with chronic periodontitis[3] with at least 20 teeth and Probing Pocket Depth (PPD) ≥ 5 mm in at least 6 sites; without systemic involvement; without periodontal treatment in the last 12 months; without use of antibiotics in the last 6 months; no pregnancy; no orthodontic therapy; non-smokers; no cardiac pace-makers users. All individuals involved were informed of the importance and purpose of the study and signed an informed consent form, previously approved by the Ethics Committee under number 0082.0.228.000-10.

Study Design

This research was an intervention study adapted[8,11] to evaluate the effects of periodontal therapies, conventional in quadrants and full-mouth. It was performed between May 2010 and September 2011 with sixty patients, 38 women and 22 men, aged between 33 and 66 (average 54.55 ±2.60). The power calculation was performed and the analysis indicated that with 30 individuals the study would have 80% power to detect a difference of 1 mm in PPD between the two groups (standard deviation of the error 1.84 ± and detectable difference of 2.43). So, the patients were included randomly (by coin toss) in two different groups:

Group A: Periodontal therapy in a single session (full-mouth ultrasonic debridement) plus mouthwash supplemented with the use of CHX for two weeks

Group B: Periodontal conventional therapy ultrasonic debridement in quadrants (partial mouth)

All the patients received Oral Hygiene Instruction (OHI) before the treatment. The CHX was used in the concentration of 0.2%, without alcohol, 15 ml, two times per day, during 60 seconds.

Experimental phase

The periodontal examination in initial, 30, 60 and 90 days after treatment, was also performed following parameters of: (1) Probing Pocket Depth (PPD), characterized by the distance from the gingival margin to pocket, (2) Relative Attachment Level (RAL), characterized by distance from the cement enamel junction to the pocket, (3) Bleeding following pocket probing (Bop), presence or absence of bleeding 30 seconds after probing.[12] These measurements were performed at four points (mesial, buccal, distal and palatal / lingual) and it was performed by a single calibrated examiner (using a periodontal probe, University of North Carolina type, 15 mm - Hu-Friedy, USA). The single calibrated examiner was calibrated for intra examiner repeatability before the beginning of the study. Five patients with chronic periodontitis were examined at an interval of 48 hours and the reproducibility was 0.990, 0.897 and 0.760 for the mean PPD, RAL and Bop.

The patients were also evaluated by Visible Plaque Index (VPI) with dichotomous counting [presence (1) or absence (0)] and Gingival Bleeding Index (GBI), which was examined all surfaces of all teeth and the presence or absence of gingival bleeding was determined by soft inspection of gingival sulcus with a periodontal probe and the presence of bleeding indicated a positive score, expressed as a percentage of a total number of gingival margins examined.[13]

Then, the periodontal therapy was performed in all the teeth, with ultrasonic debridement (tip P10; Cavitron, Dentisply) and manual curettes type McCall, No. 13/14, 17/18 and type Gracey 5/6, 7/8, 11/12, 13/14 and Hirschfield #5-11 (Hu-Friedy, USA) for SRP supra and sub gingival under aesthetic blocking of the region.

In the conventional therapy, a total of four visits per patient with an interval between the visits about seven days were

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The first re evaluation was performed 30 days after the end of treatment, where the teeth were evaluated in PPD, RAL, Bop, VPI and GBI[12,13]. The same measurements were made with 60 and 90 days after the end of treatment.

All the evaluations and treatments were performed by the same single examiner. After the initial periodontal treatment, the patients did not receive any supra or sub gingival treatment, only instruction of oral hygiene when necessary. No patients had to be included in a surgical phase after 90 days because non surgical treatment was successfully performed.

Statistical analysis

The data analyses were performed using Shapiro-Wilk, ANOVA (to PPD and RAL) and Kruskal Wallis (to Bop, VPI and GBI). All differences were considered significant at $p<0.05$). Statistical analyses were performed using Sigma Plot® statistical software package (System Software Inc., San José, CA, USA).

RESULTS

Tables 1 show the means and standard deviations of PPD, RAL and BoP, respectively, in 30, 60 and 90 days of the two therapies, showing reduction of the clinical parameters in all periods, when compared with baseline measurements.

	Groups	Initial	30 days	60 days	90 days
PPD	A	6,37±1,12	4,81±1,43	4,96±1,42	4,77±1,43
	B	6,27±1,33	4.85±1,60	5,01±1,42	4,79±1,64
RAL	A	7,15±1,42	6,17±1,75	6,22±1,73	6,11±1,83
	B	7,08±1,61	6,27±2,11	6,25±1,82	6,10±2,22
BoP	A	85,49±21,44	29,44±22,75	31.40±28,21	14.80±22,30
	B	89,23±18,24	40.25±33,45	41.35±27,80	17.28±29,43

Table 1: Mean (standard deviation) of PPD (mm),RAL (mm) and Bop (%) at different time intervals for both groups

Table 2 shows the result of periodontal therapy in intervals of 30, 60 and 90 days. There was a reduction in the levels of PPD and RAL but without statistical difference between the therapies. For the parameter of Bop, was found a statistical difference for 30 and 60 days, where the group of full-mouth showed more reduction of Bop than conventional therapy (p=0.003). But in 90 days, there was no significant difference between groups (p=0937).

For VPI and GBI parameters (Table 3), there was not statistical difference between the groups ($p>0.05$) when comparing the reduction. VPI showed a statically significance (p=.007) reduction 90 days after treatment when compared with the initial values.

	Groups	Initial	30 days	60 days	90 days
VPI	A	22.80 ±9.37	12.60 ±8,89	10.55 ±7.80	7.89 ±5.30
	B	20.30 ±7.44	14.45 ±7,67	11.21 ±7.67	8.64 ±3.99
GBI	A	39.44 ±19.45	30.88 ±12.67	23.86 ±16.67	17.37 ±10.22
	B	34.44 ±18.35	29.98 ±14.38	25.38 ±12.03	15.35 ±12.28

Table 3: Mean (standard deviation) of the VPI and GBI (both in %) at different time intervals.

Discussion

In the study, the results of different treatments at the end of 90 days of treatment (Table 2) showed that there was no statistical difference between the groups of non-surgical periodontal therapy: full-mouth and conventional therapy. Thus, the clinical results obtained with the non-surgical treatment alone showed efficacy in reducing PPD and RAL, consistent with the results of some studies,[9,14-15] which confirmed the success of the therapy in periodontal disease control. Despite others studies[9,14-15] showed the same results, the present study have clinical relevance to the practice of community dentistry and strong interest to the international readership because the most of the researchers in their works asked to have more studies about the comparison of the periodontal therapies. With more studies, different protocols and different samples have about periodontal therapy, more will be possible to understand the disease and find the most effective treatment. So, it is always welcome to the community dentistry a study trying to verify if full-mouth ultrasonic debridement provides clinically relevant improvements in the periodontal treatment.

	30 days		60 days		90 days	
	A	B	A	B	A	B
PPD (mm)	1.56±1.46	1.42±1.47	1.41±1.41	1.26±1.38	1.60±1.45	1.48±1.74
p value	0.879		0.875		0.830	
RAL (mm)	0.98±1.30	0.81±1.26	0.93±1.65	0.83±1.77	1.04±1.28	0.98±1.88
p value	0.790		0.806		0.841	
BoP (%)	56.05	48.98	54.09	47.88	70.69	71.95
p value	0.003		0.003		0.937	

Table 2: Mean (standard deviation) of reduction to the PPD and RAL parameters of the periodontal therapies in 30, 60 and 90 days and median of reduction to Bop parameter (p value: PPD e RAL according ANOVA e Bop according Kruskal Wallis).

A systematic review[16] compared clinical effects of periodontal treatment modalities (full-mouth X quadrants) finding no significant differences between them. Several studies have found no significant difference between full-mouth therapy and quadrants,[11,17-18] agreeing with the results observed in this study, where there was a reduction of PPD and RAL levels, however there is still no statistically significant difference between treatment groups.

Another a systematic review[19] calculated an RAL average of 0.64 mm and PPD of 1.18 mm, the data from this study were gains of 0.99 mm and 1.46 mm, in line with the review cited. A study[20] showed six months after full-mouth ultrasonic debridement, the PPD reduction was 2.03 mm and 4.24 mm for the initially moderate and deep pockets, respectively. At the same time, RAL gain was 1.80 mm and 3.90 mm, respectively. And, according another study,[21] in also six months after full-mouth ultrasonic debridement the PPD changes were 1.93 and 3.44mm and RAL gain of 1.21 and 2.41mm for moderate and deep pockets, respectively.

A study[22] used three different treatments, full-mouth with CHX, without CHX and conventional without CHX in 25 patients and, at the end of the study, the authors found no difference between the groups and no difference in the presence or absence of CHX adjunct to treatment. Another study[23] also compared full-mouth against conventional therapy in 39 patients and found that, at the end of 90 days, no differences were found between the groups. Both aforementioned studies are consistent with the data found in the present study.

Some studies[8,11,17,24] compared full-mouth and conventional therapies with CHX groups which included placebo, and there were found some important effect adjunct of CHX within six months of follow up. In the present study, the groups also received full-mouth plus CHX; however the results showed no difference between groups, agreeing with the findings cited above. A systematic review[25] also showed that full-mouth with or without antiseptics not from significant clinical benefits in patients with chronic periodontitis. Anyway, the efficacy of CHX has been demonstrated in several studies[26-28] because of the antibacterial power and substantivity of this solution.

A study[29] evaluated 184 patients with moderate to severe periodontitis in four treatment groups: full-mouth + metronidazole, full-mouth + placebo, conventional + metronidazole and conventional + placebo and no differences were observed in the mean RAL and PPD values between the four experimental groups at baseline and 12 months post-treatment. A study[30] failed to demonstrate differences in the clinical, microbiological or immunological outcome between full-mouth and quadrant scaling and root planning. In the present study, there was no statistically significant difference between treatment groups at different time intervals.

CONCLUSION

At the evaluation 90 days after treatment, no statistical difference was found between the two periodontal therapies, but at 30 and 60 days, the parameter BoP showed more reduction for the full-mouth therapy.

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