

UTILIZATION OF CHLORHEXIDINE IN PROPHYLACTIC TECHNIQUES OF PROFESSIONAL HYGIENIZATION

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ABSTRACT

The present clinical study evaluates the results obtained by the application of the classical methods of professional hygienization through ultrasonic scaling, brushing, air flow, comparatively with the additional contribution brought about by chlorhexidine (CHX). The study was developed on a group of 328 subjects, equally divided into a reference, respectively an experimental group. Each group was subdivided into a batch of subjects affected with gingivitis, respectively a batch with persons suffering from periodontopathies. Each patient belonging to the reference group was subjected to professional hygienization, namely scaling with ultrasounds, professional brushing, fluorization, while the subjects forming the experimental group benefited from an additional application of chlorhexidine – in the form of a 1% concentrated gel – inside the subgingival ditches and interdental spaces.

Keywords: chlorhexidine, scaling, profilactic , clinical signs , periodontal

INTRODUCTION

At present, the gingival-periodontal diseases are endangering more and more frequently the health condition of the modern people. The etiological factor causing the installation of periodontal diseases is, obviously, the accumulation of bacterial plaque on teeth surface, combined with a poor oral hygiene [1].

Recent epidemiological studies [2,3,4] put into evidence a close relation between the extent of bacterial plaque deposition and the manifestation of chronic gingivitis, whereas clinical investigations demonstrated that the bacterial plaque is the main etiological factor of gingival inflammation. The subgingival plaque, derived from the supragingival one, is also directly associated with advanced lesions

characteristic for the periodontal affections.

Consequently, application of some antiseptic solutions and, in certain cases, even of antibiotics – the TM solution – for reducing the number of bacteria present in the subgingival spaces is necessary for the prevention and management of gingival-periodontal diseases. The only antimicrobial agent capable of being retained and slowly released in the oral cavity, thus inhibiting bacterial plaque formation is chlorhexidine (CHX), actually classified by the Oxford Dentistry Department as the “gold standard” [5]. However, the clinical manoeuvre of gel application for improving the clinical parameters is still controversial. [1,6] Until now, CHX appeared as the most efficient inhibitor of the bacterial plaque, being

present in solutions or gels either alone or associated with excipients or aromatic flavours. The most stable form is chlorhexidine digluconate, in concentrations varying between 0.01% and 4%. [7]

Inside the dental office, prevention of gingival-periodontal diseases induced by bacterial plaque accumulation involves ultrasound scaling, dental manoeuvres for the removal of the supra and subgingival bacterial plaque, namely elimination, as much as this is possible, of the bacterial microflora deposited on teeth surface. Also recommended are: professional dental brushing, air-flow and subsequent fluorine applications for enamel remineralization and cure of the tooth sensibility, manifested in some patients [8]. Some studies evidenced certain antimicrobial effects of fluorine. As a matter of fact, it was demonstrated that addition of the fluorine atom in the composition of quinolones intensifies the bactericide effect and enlarges the action spectrum upon gram positive cocci, as well, through inhibition of the DNA-gyrase enzyme, which gives the class of antibiotics known as fluoroquinolones (metronidazol, ofloxacin, ciprofloxacin, etc.) [9].

The present study evidences the advantages brought about by treatments with chlorhexidine – in the form of a 1% concentrated gel - directly in the gingival pockets, in patients suffering from gingival-periodontal diseases, and by hygienization of the oral cavity by the above-mentioned techniques: ultrasound scaling, professional brushing, air flow and fluoridation.

MATERIAL AND METHODS

The investigation included a total number of 331 subjects, divided into two groups: a reference and an experimental one.

The control group was formed of 164 subjects, 83 (43 men and 40 women affected with gingival diseases, with ages ranging

between 5 and 29 years (mean age: 20 years) in the case of men, and between 16 and 30 years, respectively, in the case of women (mean age: 24 years), while the remaining 81 subjects (45 men and 36 women) – with ages between 32 and 70 years (mean age: 45 years) in women and between 31 and 63 years in men, suffered from moderate up to severe forms of marginal chronic periodontopathy.

The experimental group was formed of a total number of 167 subjects, 81 of them (37 men and 41 women) affected with gingivitis, with ages ranging between 12 and 24 years, in the case of women, and between 14 and 35, respectively, in the case of men; the group suffering from periodontopathies included 86 subjects, namely 34 men with ages between 30 and 72 years, and 52 women, with ages between 29 and 72 years.

Professional hygienization, involving ultrasound scaling, was applied to all subjects, in some cases, subsequent professional brushing, air flow and local fluoridation being also performed. In the experimental group, applications with chlorhexidine (as a 1% concentrated gel) in the subgingival pockets and in the interdental spaces, by means of sterile gauze sponges applied for 1-3 minutes, were also performed as a final manoeuvre.

Ultrasound scaling was performed at the intensity corresponding to the deposition degree of the tartar – the scale – on tooth surface and in the sub- and supragingival pockets, with a scaling probe adapted to each case in part. In this way, the scope of ultrasound scaling – that of eliminating all deposits of bacterial plaque present on the tooth surfaces, in the proximal spaces, and also in the supragingival spaces and especially in the subgingival pockets, through mechanical vibrations at a frequency ranging between 25000 and 46000Hz - was attained. Irrigation with distilled water from the ultrasound device was performed without the

addition of antiseptic solutions in any of the two groups.

Professional brushing was performed with a brush mounted to the angulated handpiece from the dental unit, with professional paste (CLEANIC - Kerr or DETARTRINE - Septodont), for the removal of the soft bacterial plaque from all tooth surfaces, as well as from the subgingival pockets, to the extent permitted by the physiological limit.

Air flow was made with an EMS AIR FLOW HANDY 2 device mounted to the turbin of the dental equipment. This equipment is pulverizing the sodium bicarbonate-based powder in order to eliminate of the rests of scaling and of the tooth stains caused by aliments or liquids.

Fluorine application, known as reducing the risk of bacterial plaque formation through enamel remineralization, consisted in applying cotton pellets initially impregnated with fluorine or in application of the fluorurated gel in disposable mouth guards. Application was done on all vestibular and oral (palatinal, respectively lingual) surfaces of the teeth with dentinary sensitivity as antecedents, the fluorine-impregnated cotton pellets being left in contact with the dental surfaces for 5 minutes. The patients were

advised to avoid eating and drinking 30 minutes after the cotton pellets removal, for permitting a good fluorine action along this time period.

Local applications with chlorhexidine – as a 1% concentrated gel - were performed, in the subgingival pockets and interdental spaces, only in the subjects forming the experimental group. As in the case of fluorine applications, the patients were asked not to rinse, consume liquids or aliments for 30 min, in order to keep the fluorine respectively chlorhexidine, in contact with the teeth surface and gums for a longer period of time.

All the 331 patients were subjected to professional hygienization, accompanied - in 2 cases, belonging to the experimental group - by gingival curetting, as well.

Distribution of the 164 subjects of the REFERENCE GROUP (RG):

- GROUP 1: 20 subjects – ultrasonic scaling associated with professional fluoridation
- GROUP 2: 137 subjects – ultrasonic scaling, professional brushing, professional fluoridation
- GROUP 3: 7 subjects – ultrasonic scaling, professional brushing, air flow, fluoridation.

Table 1. Distribution of subjects in The REFERENCE GROUP - RG regarding sex as a variable

	Group 1		Group 2		Group 3		TOTAL	
	20 patients	%	137 patients	%	7 patients	%	164 patients	%
Women	10	10%	80	86%	3	3%	93	56%
Men	10	7.1%	57	80%	4	5%	71	4%

Table 2. Distribution of RG subjects as a function of gingival-periodontal affection

	Group 1		Group 2		Group 3		TOTAL	
	20 patients	%	137 patients	%	7 patients	%	164 patients	%
Gingivites	9	10%	72	86%	2	2%	83	50%
Periodontites	11	13%	65	80%	5	6%	81	49%

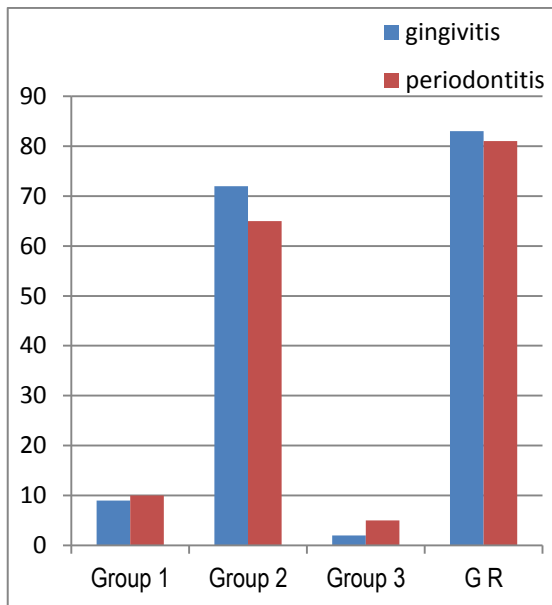


Figure 1. Distribution of subjects from the control group according to their gingival-periodontal affections

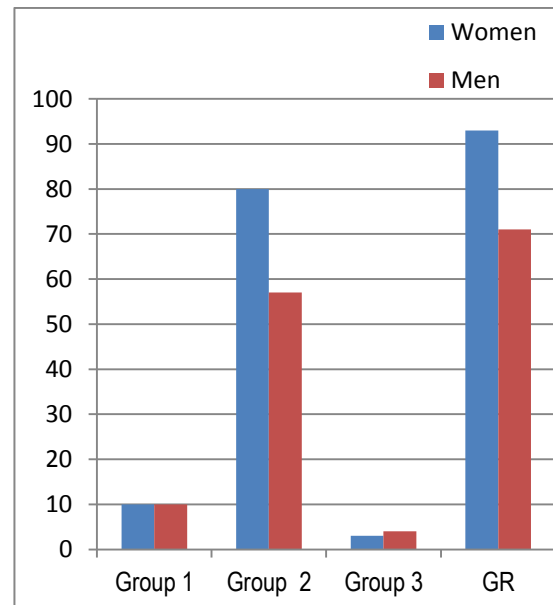


Figure 2. Distribution of subjects from the control group as a function of sex

Situation of the 167 subjects forming the experimental group (GS):

- Group 1: 80 subjects – ultrasonic scaling, professional brushing, professional fluorization and applications with chlorhexidine as a 1% concentrated gel
- Group 2: 50 subjects – ultrasonic scaling, professional brushing and applications with chlorhexidine – as a 1% concentrated gel

- Group 3: 17 subjects - ultrasonic scaling, professional brushing, air flow and subsequent applications with chlorhexidine, as a 1% concentrated gel
- Group 4: 19 subjects – ultrasonic scaling, professional brushing, professional fluorization, air flow and applications with chlorhexidine as a 1% concentrated gel.

Table 3. Distribution of subjects from the experimental group as a function of sex

	Group 1		Group 2		Group 3		Group 4		TOTAL GS	
	80 patients	%	50 patients	%	17 patients	%	19 patients	%	167	%
Women	47	28%	22	13%	12	7.2%	11	6.5%	92	56%
Men	33	19.7%	28	16.8%	5	3%	8	4.8%	75	44%

Table 4. Distribution of subjects from the experimental group as a function of their gingival-periodontal affection

	Group 1		Group 2		Group 3		Group 4		TOTAL GS	
	80 patients	%	50 patients	%	17 patients	%	19 patients	%	167	%
Gingivites	48	29%	17	10%	5	3%	13	7.8%	84	50%
Periodontites	32	19%	33	19%	12	7.2%	6	3.6%	83	50%

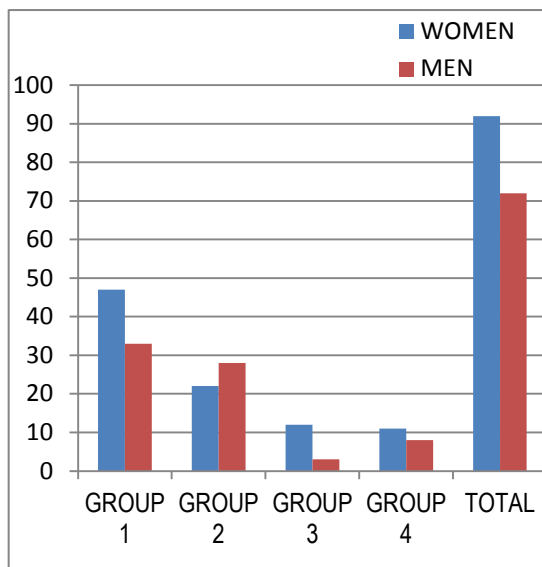


Figure 3. Distribution of subjects from the experimental group as a function of sex

All data were processed within a spreadsheet calculation program MICROSOFT EXCEL 2007. All the data base have been transferred into the computerized program SPSS 16.0 from IBM. The statistic analyzing procedure have been made with the statistic test t-Test. The variables of interest were compared according to biostatistic protocols regarding the statistic relevance p lower then 5% ($p <= 5\%$).

RESULTS

In the control group, professional hygienization realized a thorough cleaning of the hard (scale) and soft (pellicle of non-adhering dental plaque present on the dental surfaces) deposits, removal of the stains and prevention of bacterial plaque deposition and also of teeth remineralization through the action of fluorine. It was only in the case of subjects with bacterial gingivites that a temporary improvement of the clinical aspect of the dental-periodontal tissues was observed, while, in cases of periodontopathies, healing of the periodontal tissues is a long process, without visible signs

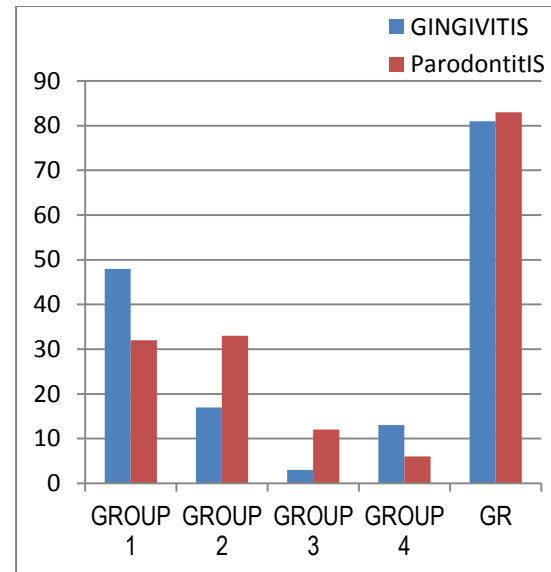


Figure 4. Distribution of subjects from the experimental group as a function of their gingival-periodontal affections

of blurring of microflora recolonization in the gingival ditches.

In the experimental group, professional hygienization assured both a total removal of the dental plaque through ultrasonic scaling, professional brushing and air flow, and prevention of its deposition by means of local applications with fluorine, which also assured teeth remineralization and prevention of tooth sensitivity after scaling. Unlike the case of the control group, the applications with chlorhexidine (as a 1% concentrated gel) in the gingival pockets and interdental spaces aimed at preventing recolonization of subgingival microflora through the antiseptic effect induced by the action of chlorhexidine.

A comparison between the two groups considered for the study evidenced, in all subjects of the experimental group, a clinical reduction in the symptomatology of the gingival-periodontal illness, absence of gingival inflammation and of gingival bleeding and lower scale deposits, over a much shorter time period.

The periodical control performed after 6 months showed that, in 10 patients of the

control group, a consistent dental plaque was present, requiring its removal through scaling. In 5 subjects, scaling, followed by brushing and fluorization were applied. In the experimental group, 2 cases required a new scaling intervention. Another observation was that, during the periodical control on the deposition of soft layers, out of the 164 cases analyzed in both groups, a sensibly lower number – only 15 – evidenced (by means of the coloration method) deposits of bacterial plaque, comparatively with a number of 50 patients with bacterial plaque, in the reference group.

The conclusion of the present investigation is that application of CHX after scaling leads to a 5 times reduction of dental scaling and to a 3 times reduction of the bacterial plaque.

DISCUSSIONS

The present investigation, including a total number of 331 subjects, was performed in the “MED CLINIC” Clinic along 6 years. The first 3 years of the study (2006-2009) were characterized by the absence of chlorhexidine utilization in dental treatments in any of its forms while, starting with the year 2010, a 1% concentrated chlorhexidin gel was applied - after professional hygienization - in the subgingival ditches and interdental spaces.

Chlorhexidine should be applied – as periodical oral rinsing - prior to and after each surgical manoeuvre, prior to ultrasonic scaling and after any domestic surgical intervention. Rinsing with a CHX solution prior to any scaling session is recommended

in order to insure a local hygienic gums and teeth surfaces [15].

The published data recommends application of flourine solutions or gels after any scaling session, for remineralization of the enamel deteriorated by the acid attack of the bacterial plaque, taking into account also the limited antiseptic effect of fluorine upon the bacterial plaque.

CONCLUSIONS

Most of the patients do not succeed in having an optimum control of the bacterial plaque through individual brushing at home as, usually, the brushing technique applied by them is an incorrect one. Consequently, deposition of an antimicrobial agent directly in the subgingival pockets or in the periodontal pockets is the optimum solution for controlling and maintaining the symptoms within normal parameters.

Accordingly, if considering the properties of chlorhexidine, professional hygienization through ultrasonic scaling, associated with professional brushing, air flow and fluorization led to considerably better results in the experimental group, comparatively with the reference one, where no treatment with clorhexidine had been performed.

Applications with chlorhexidine, as a 1% concentrated gel, in the subgingival ditches, after ultrasound scaling, may thus represent a compulsory therapeutical stage, assuring an optimum hygiene condition of periodontopathic subjects.

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