

V. DENTISTRY

COMPARATIVE STUDY BETWEEN CONVENTIONAL AND MODERN METHOD OF PROFESSIONAL DENTAL HYGIENE

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Abstract

Objective. The aim of this study is to demonstrate the superiority of one modern dental hygiene technique comparative with conventional methods including manual scaling, ultrasonic scaling and professional toothbrushing.

Materials and methods. 94 patients, divided in 3 groups were included in a preventive program for a 2 years period, applying to each group one professional hygiene method every 3 months. Using the following indices: Oral Calculus Index (OCI), plaque index Quigley-Hein modified by Turesky (QH) and the gingival index Loe and Silness (GI) it was evaluated the efficiency of each method.

Conclusion. The results indicate that Prophylflex is a good alternative to conventional methods of professional dental hygiene.

Key words: plaque control, scaling, modern prophylaxis, Prophylflex

Introduction

There is no universal or simple way to define what is “health” and what is “disease”. Indeed, these very notions may differ according to regions, populations or age categories in the world. Furthermore, our perception of health and disease has changed over the years. Health was previously defined as a “state of physical, mental and social wellbeing and ability to function and not merely the absence of illness or infirmity”. Today, health is a relative entity and a healthy person is someone who is able to lead an economically and socially productive life (WHO 1995). Disease is actually defined as a definite deviation from the normal state (American Academy of Periodontology 1992).

Oral health certainly fits within the broader domain of health related quality of life. Quality of life has been profoundly influenced by modern economic development (Feinstein 1993, Govaerts 1995). This applies particularly to industrialized countries where the quality of life of populations is part of economic values and has reached high standards (Diderichsen 1990, Scheuch, 1995). The oral health of a population is influenced by many parameters, including exposure to risk factors, susceptibility to disease and psychosocial and behavioral factors.

Throughout life, all external surfaces of the body are exposed to colonization by a wide range of microorganisms. In general, the establishing microbial flora lives in harmony with the host. Constant renewal of the surfaces by shedding prevents the accumulation of large masses of microorganisms. In the mouth, however, teeth, implants and prosthodontic devices provide hard, non-shedding surfaces for the development of extensive bacterial deposits.

It is well documented that toothbrushing and other oral hygiene procedure can prevent or control gingivitis and periodontal diseases. The caries-preventive effect of daily toothbrushing has been labeled as controversial in earlier reviews (Hine 1948, Andlaw 1978, Bellini et al. 1981). However, several clinical trials in the last two decades have demonstrated that more frequent professional tooth cleaning can produce a dramatic reduction in dental disease, including dental caries. These observations have created new interest in the association between mechanical oral hygiene and caries.

The control of dental plaque is the key factor in preventing gingivitis, periodontitis and dental decay. It is linked directly to the only etiological factor of these diseases: oral pathogenic bacteria which colonize the dental surfaces and forms the dental plaque. Mechanical plaque control by professional tooth cleaning involves removal of supragingival plaque and 1-3 mm of subgingival plaque with the use of a mechanically driven instrument and prophylaxis paste. It may also include the removal of calculus and deep subgingival plaque.

At the workshop in Bethesda in 1986 it was recognized that the need for professional care differs for different individuals and is related to patient attitudes, skills and individual susceptibility to disease (Frandsen, 1986). Hygiene in dentistry has reached today new shapes and dimensions. A delicate issue like the removing of dental plaque, of soft deposits and smoke and coffee discolorations it could be solved with the help of modern methods of professional hygiene. Modern prophylaxis admits the importance of clean dental surfaces and it was born from the necessity of obtaining good results in removing dental plaque and discoloration.

Material and method

In this study were included 135 patients with age between 6-18, from which were selected 94 patients with calculus deposits and pigmentation of the dental surfaces. The patients were divided in 3 groups and they were included in a preventive program. Prophylaxis included demonstration of oral hygiene technique, professional cleaning of all tooth surfaces and topical application of fluoride. The study was developed over a two years period and the patients were recalled every 3 months.

Prophylaxis also included oral hygiene instruction with emphasis on interproximal cleaning and professional mechanical plaque control including scaling and polishing with abrasive pastes as classic preventive measures and the use of Prophyflex as a modern alternative in prophylaxis. Prophyflex releases a homogeneous water-air-bicarbonate of potassium mixture at the tip of the hand piece just before the emission of the stream. This thing provides the rounding of the crystals of bicarbonate, the mixture being abrasive and also having a gentle action on the dental surfaces and implants of titan on witch they didn't determinate rugs surfaces. (Barnes et.al.1994).

The selection of the patients was made randomly having in mind only the quantity of the calculus deposits evaluated to a clinical examination in the first appointment by using oral calculus index (OCI). Many of the indices used to evaluate the presence of calcified deposits are components of other indices evaluating the oral hygiene status.

The Oral Calculus Index (OCI, Greene & Vermillion1960, 1964) scores are assigned according to the following criteria:

- 0- no calculus present
- 1- supragingival calculus covering not more than one-third of the exposed tooth surface being examined
- 2- supragingival calculus covering more than one-third but not more than two-thirds of the exposed tooth surface, or the presence of individual flecks of subgingival calculus around the cervical portion of the tooth
- 3- supragingival calculus covering more than two-third of the exposed tooth surface, or a continuous heavy bank of subgingival calculus around the cervical portion of the tooth

Patients were divided into 3 groups, according to the OCI index, as follows:

Group-patients	OCI
1- 25	2,6-2,9
2- 37	2,1-2,5
3- 32	1,3-1,9

Group 1- 25 patients with massive calculus deposits, present on lingual, facial surfaces-OCI 2,6-2,9

Group 2- 37 patients with calculus deposits present only on lingual surfaces- OCI 2,1-2,5

Group 3 – 32 patients with moderate calculus deposits present on lingual surfaces especially on the interproximal surfaces OCI 1,3-1,9.

In the first appointment without taking in consideration the professional hygiene method applied, it were filled in the dental files to all of the patients registering the dental plaque and gingival indices.

It was used as dental plaque index the Quigley-Hein modified by Turesky plaque index (QH). This index represents another system for evaluating the occlusal extension of plaque. The labial surfaces of the anterior teeth are divided into four segments. The amount of plaque is determined with disclosing solution and scores ranging from 0 to 5 are assigned. The average amount of plaque per tooth surface and per person was then computed. A modification of this Quigley-Hein plaque index was used by Turesky et al. (1970) and included both the facial and lingual surfaces of all teeth. The score per person is derived by a sum of the plaque scores divided by the number of surfaces examined. The reason for that we used this index is the fact that it could register the dental plaque to all of the dental surfaces.

For evaluating the status of the gingival tissue we used the gingival index Loe and Silness (GI).

Scaling is the basic procedure by which calculus is removed from the surface of the teeth. Scaling is divided into supragingival and subgingival scaling, depending on the location of the calculus in relation to the gingival margin.

For the supragingival scaling it was been used scalers: sickle, hoe and chisel.

To the first group formed by 25 patients with massive tartaric deposits we calculated the dental plaque indices, witch had the following values:

- 11 patients had score 3,3-3,7 which showed that the facial surface was covered with dental plaque more than 1/3 but less than 2/3 and
- 14 patients had score 4,2-4,8 which meant that more than 2/3 of the facial surface was covered with dental plaque. In order to reveal the dental plaque we used as disclosing agent the Plak –Lite system a more efficient method for observing the dental plaque deposits with the help of a light source which reveals the dental plaque in yellow.

It was proceeded manual scaling and professional tooth brushing with abrasive pastes and after that it was used again a disclosing agent and it was recorded the new value of the dental plaque index.

Table with Quigley-Hein(OH indices modified by Turesky before and after manual scaling

Group 1	patients	OH indices
BEFORE	14	4,2-4,8
	11	3,3-3,7
AFTER	19	2,4-2,9
	6	1,7-1,9

The values of the gingival indices were:

- 17 patients had score 1,8-2,3 moderate inflammation-with erythema, edema, hypertrophy and bleeding on probing,

- 8 patients had score 0,7-1,5 mild inflammation with a slight change in color and structure of the gingival tissue

Group 1	patients	GI indices
BEFORE	17	1,8-2,3
	8	0,7-1,5
AFTER	14	1,3-1,8
	11	0,6-0,9

Group 2	patients	OH indices
BEFORE	29	3,8-4,4
	11	2,8-3,5
AFTER	31	2,1-2,3
	6	1,2-1,6

Group 2	patients	GI indices
BEFORE	20	1,4-1,7
	17	0,9-1,2
AFTER	12	1,1-1,3
	25	0,4-0,6

To the second group formed by 37 patients with calculus deposits we calculated the initial value of the dental plaque index: 29 patients had score 3,8-4,4, 11 had score 2,8-3,5. At this group we carried out professional cleaning by using ultrasonic scaling, followed up by professional tooth brushing and the determination of the new dental plaque index. It was determined for the second group the GI indices before and after the professional cleaning. The values of the gingival index (GI) were the following: before the procedure for 20 patients score 1,4-1,7 and for 17 patients score 0,9-1,2 and after the procedure for 12 patients score 1,1-1,3 and for 25 score 0,4-0,6.

Group 3	patients	OH indices
BEFORE	18	2,5-2,8
	14	1,7-2,1
AFTER	12	0,8-1,2
	20	0,4-0,6

The third group was formed by 32 patients and they were cleaned with the help of Prophyflex. The initially scores of the dental plaque indices were: for 18 patients score 2,5-2,8, for 14 patients score 1,7- 2,1 and after cleaning 12 patients had score 0,8-1,2 and 20 patients had score 0,4-0,6.

The gingival index (GI) had the score 1,1-1,3 for 7 patients and score 0 for 25 patients. The patients were recalled every 3 months for a period of two years. To every 3 months we proceeded to the evaluation of dental plaque indices and gingival indices and it was initiated a cleaning program; it was individualized to each patient his personal needs for treatment. For that, there were combined the methods that it was used in this study: conventional methods consisting of manual scaling, ultrasonic scaling associated with professional tooth cleaning with modern cleaning using Prophyflex. So, in this second part of the study it was also applied to the first and to

the second group professional cleaning with Prophyflex. The results obtained were similar to the results that were obtained to the third group: score 0 at the dental plaque index. Obviously the maintenance of these results is related to each individual personnel skills and ability to practice every day proper dental care.

Results and discussion

The first objective of treatment is to create an environment in which the tissues can return to health. In the sequence of patient treatment, introduction to preventive measures is first, before professional instrumentation. After health has been attained, the patient's self-care on a daily basis is essential to keep the teeth and gingival tissues free from disease caused by the microorganism of bacterial plaque. Professional instrumentation makes a limited contribution to arresting the progression of disease without daily plaque control measures by the patient.

General objectives are that dental hygiene instrumentation will:

- *create an environment in which the tissues can return to health and then be maintained in health*
- *aid in the prevention and control of gingival and periodontal diseases by removal of factors that predispose to the retention of bacterial plaque(dental calculus, irregular and overhanging restorations)*
- *provide the patient with smooth surfaces which are easier to clean and to keep plaque free*

After it was finished the professional cleaning to each patient it was preceded to the registration of the dental plaque indices in order to evaluate the efficiency of the prophylactic method that it was chosen.

To the first group of patients to which we carried out manual scaling, after we used a disclosing substance the value of the dental plaque index was in the most of the cases 2,1-2,4 (for 17 patients) and 1,3-1,5 (for 8 patients). It was observed fine dental plaque and soft deposits to the gingival border. At the next appointment it was calculated the gingival index Silness and Loe (GI) which had a decrease from 1,5- 1,3 to 1,1-0,9 for 12 patients and a decrease from 0,6-0,3 to 0,2-0,1 to 7 patients. 6 patients from this group showed the same values of the gingival index: 2 patients had score 2, 2 patients had score 1 and 2 patients had score 0. These results indicated us that were necessary an improving on the cleaning method that we had chosen and that only the manual scaling was not enough to obtain healthy gingival tissue.

The second group benefited of ultrasonic scaling and professional tooth brushing. It was obtained were the following data: dental plaque indices (OH) decreased from values 1,6-1,8 to values 1,3-1,5 . The gingival index of Silness and Loe (GI) also showed a decrease from values 0,4-0,3 to 0,2-0,3. It could be discussed the results to this group in the way that for obtaining best therapeutically improvement and esthetic aspects an additional cleaning method was imperative.

In clinical practice thee are frequently situations in which after classic therapeutic measures including manual

scaling, ultrasonic scaling, dental surfaces or restorations showed fine dental plaque tracks or calculus deposits. These remarkable results are due to using Prophyflex which incorporate a unique system of cleaning and we don't have to make confusions with other system which are pulverizing separately the water and the air / abrasive particles.

The third group was cleaned using Prophyflex. The plaque indices decreased obviously (value 0). There were obtained the best results in the case of using Prophyflex fact that it was noticed by using a disclosing agent (Plak-Lite system). When it was used the dental probe to the first two groups it was detected roguishly surfaces (it was a sign that the dental surface was not proper cleaned existing the risk of the reconstruction of the calculus deposits and dental plaque deposits). In the case of using Prophyflex all this inconvenience was non-existent.

Conclusions

Comparative with the dental hygiene units that are existing on the market in this moment, Prophyflex utilizes this homogeneous mixture which can get access in places witch are not accessible to usual cleaning systems like the interproximal areas, the spaces between brackets and orthodontic ring- without showing loses of composite or cement because of the diffusion of the stream around of this elements.

The efficiency of the Prophyflex system derives from the numerous advantages witch it have by comparing with the conventional methods: it is pain-free, it does not have negative effects on the human body, it does not need special installation (it uses a low pressure 35psi-it permits the adaptation to the dental unit in the place of the turbine), it is small, portable, easy to use, the hand piece is removable, easy to clean, it could be used for bleaching of tooth, it is an alternative to the scaling of the teeth with high sensitive and the time for work is reduce to half.

There were obtained better results concerning dental surfaces which were clean, smooth, bright to the patients that had professional tooth cleaning with the help of

Prophyflex in stead of the patients witch were cleaned by using conventional methods. The use of Prophyflex increased effectiveness of plaque control measures. A smooth surface is easier for the patient to keep clean.

Removal of subsequent calculus deposits is easier because calculus will be less firmly attached to a smooth surface than to a rough one in which the calculus could become embedded in undercuts and other tooth surface irregularities.

The quantification of the results it was made by following the values of the dental plaque and gingival indices before and after we initiated the dental hygiene measures. With regard to the effectiveness of instrumentation, it is apparent that there is little difference in clinical response between manual, sonic and ultrasonic instrumentation. It may be that a technique for scaling and root planing that is instrument-driven, requiring less time and endurance (for both clinician and patient) is more cost-effective.

As a conclusion it is indicate the use of the Prohyflex in the situation in which it must be obtained aesthetic results, but in the case of massive calculus deposits the therapeutically measure is oriented on using manual scaling, ultrasonic scaling and professional cleaning.

Future research into the most cost-effective methods of education and instruction in order to achieve adequate self-care for sustained periods of time would be of value. The development and adequate evaluation of new mechanical plaque control aids which may increase the efficacy of plaque control and in particular enhance interproximal plaque control is warranted. In a report by Fejerskov (1995) dealing with the design of preventive programs, it was concluded that until tests with sufficient predictive power are developed for the identification of groups or individual at higher risk, a population strategy for prevention should be maintained and developed further, with emphasis on oral hygiene as it influences norms and behavior.

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