

Study regarding the connection between the oral hygiene status, plaque control methods and the periodontal involvement in a group of adults

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Summary

The purpose of the study consists in the assessment of the level of oral hygiene and periodontal condition compared with the plaque control methods used by our patients. *Method:* the study group includes 94 adult subjects aged between 18-64 years, which requested during January-April 2007 dental and periodontal treatment. Objective examination was correlated with a subjective investigation using questionnaires including 11 questions about the totality of individual plaque-control methods, which were answered by each patient. *The results* show a higher distribution (68%) of young patients among the total group. The oral hygiene measured by using Oral Hygiene Index (OHI) was found to be correlated with the subjective opinion of the patients (correlation coefficient $r=0,5101$, with a probability index $P<0.0001$) and with the correctness of manual tooth brushing and only in a low proportion with the electric toothbrush (22%). Among the secondary plaque control methods the dental floss seems to be used only by a low number of patients (20,21%). No significant statistical difference was found between the oral hygiene level in smokers and non-smokers. *The conclusions* of the study show an existing connection between the objective assessment and the subjective evaluation of oral hygiene status, which depend directly on the correctness of using principal methods of plaque control. Gingivitis category is the main periodontal pathology found in the studied group, and the periodontitis show to be present with the increasing of age, predominating only in the third age group and directly correlated with the OHI.

Key words: periodontal disease, oral hygiene index, bacterial plaque.

Introduction. Motivation

Epidemiology studies the distribution of a disease among the population as well as the factors which influence it [11]. One of the first extended epidemiological studies was done in 1955 in India by Marshall-Day and co [12]. They included a group of 1187 dentate subjects. The purpose of the study was to assess the periodontal status related to the alveolar bone height. They noticed that the percentage of patients with peri-

odontitis and alveolar bone loss increased with the age. After age of 40 years the authors found a 100% occurrence of destructive periodontal disease. In 1964 Sherp reviewed the literature on the epidemiology of periodontal disease and concluded that **periodontal disease appears to be a major, global public health problem affecting the majority of the adult population after the age of 35-40 years** and more than 90% of the periodontal pathology can be explained by age and oral hygiene [18].

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The periodontal disease has an important social characteristic and its onset and evolution is related to the age, occupation, living standard, education, the frequency of dental monitoring [8,19]. The level of civilization and the technical progress allow new methods of plaque control to become available, being known that the bacterial plaque is the primary factor involved in the onset and evolution of the periodontal disease [8,10,23]. The most important factor in the prophylaxis of periodontal disease is also the control of the bacterial plaque deposition [6,24] which, by its development provides proper environment of the periodontal pathogen bacteria to colonize and grow [9] and to induce the periodontal inflammation and finally tooth loss [3,7,20]. Another serious consequence of the presence of periodontal pathogens can be the possibility of the evolution of cardiac diseases [13,21].

This study, as part of a more extended evaluation study is motivated by the necessity of a correct and accurate assessment of the periodontal health status of the population of Constanta city. Considering also the role of the daily oral hygiene [17,24] which means the totality of the plaque control methods (tooth brushing, secondary methods, mouthwashes with antiseptic effect), the study intended to make a comparison of the attention of the patient for the plaque control and the existing periodontal status.

Materials and Methods

The method of the study is based on the following:

1. The objective periodontal examination of each patient, including the oral hygiene status evaluation using the plaque and calculus indices.
2. The subjective data including the totality of plaque control methods which are used by the patients, collected with the aid of the questionnaires adapted to the study purpose. The questionnaires are including

11 questions to which each patient has to answer by choosing the proper variant suitable for its daily oral hygiene habits. The second section of the questionnaires include the objective data like oral hygiene indices, the periodontal diagnosis and also the written consent of the patient with the participation at this study.

A number of 94 adult patients which were addressing to the Periodontology discipline and/or the Dental Medicine Social Center of Constanta Faculty of Dental Medicine and Pharmacy between January-April 2007 agreed to follow the previously presented protocol. The Vth and VIth year's students were a real help at the periodontal examination during the periodontology and social practice lessons.

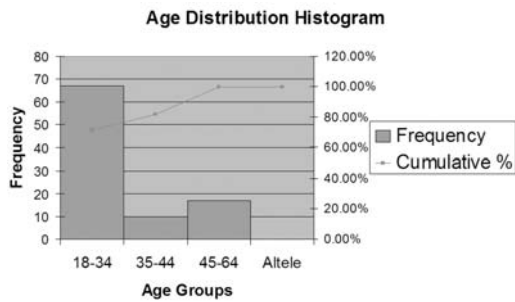
According to the age categories used by the WHO (World Health Organization) for the epidemiological studies [2] we divided the total age group of subjects in three categories: age group 18-34 years, age group 35-44 years, age group 45-64 years.

The patients have different social levels, without being separated according to the degree of study, because the dental health should be the same for the entire community, no matter the study degree of its members [1]. For the statistical analysis two programs were used, Microsoft Excel® program [14] and Med Calc® program [15].

Results and discussions

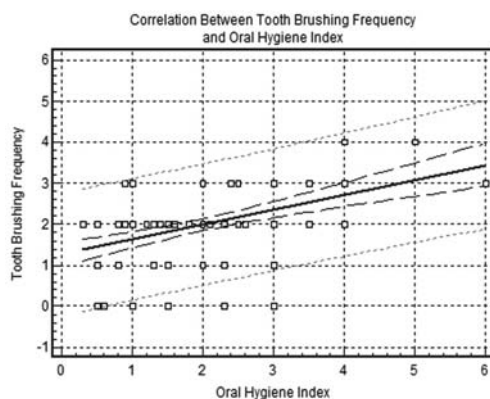
In order to introduce the qualitative data in the statistical program, numerical values were given.

The graphic nr. 1 illustrates the histogram of the age distribution. The higher percentage from the total group of subjects is attributed to the first age group (18-34 years) in proportion of 68%, followed by the third age group (45-64) in proportion of 18%.



Graphic nr.1

Comparing the frequency of daily tooth-brush assessed by the subjective examination with the objective evaluation of the OHI (oral hygiene index) results a positive statistical correlation (Student test) with a correlation coefficient $r=0,51$ higher than the critical value 0,26. This suggests the decreasing of the plaque depositions in patients with a higher tooth brushing frequency, in concordance with other studies which show that in order to maintain an adequate oral hygiene is recommended minimum two times per day tooth brushing (Lang and co 1973) [10]. The Spearman's rank correlation coefficient applied to the same data shows also a statistical positive correlation with a correlation coefficient $r = 0,5101$ and a probability index $P < 0,0001$ (see graphic nr.2).



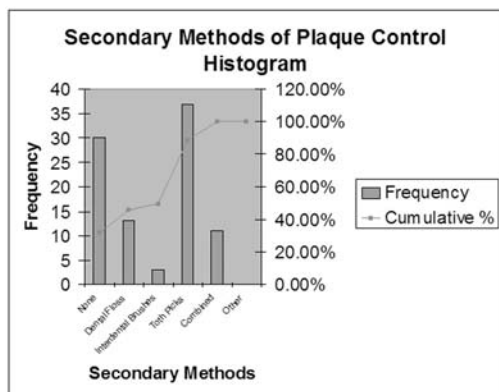
Graphic nr.2

Other studies suggest that an adequate oral hygiene depends upon the quality of the tooth brushing than on its frequency (Bjertness 1999) [10]. From our data does not result a positive statistical correlation between the quality of tooth brushing and the plaque index (PI). Regarding the tooth brushing technique the majority of the patients (79,7%) use combined movement, which seems to be superior to the horizontal or vertical movements-Leonard technique[10].

Although some literature studies (Rapley and Killoy 1994, Egberg and Claffey 1998) show the superiority of the electric tooth brushing especially at the interproximal areas [10], a small proportion of our study group (22%) affirm that used it. From the personal clinical experience we can observe that the electric tooth brush can be a good alternative to the classic toothbrush, especially for some categories of patients, which do not have a good dexterity [16].

An unpleasant finding is that the use of the secondary plaque control methods is done by a low proportion of the patients (graphic nr.3), in concordance with other studies [4]. A proportion of 31,9% of the total number of patients do not use any secondary method. Among the used methods, the first place is occupied by the tooth picks (39,36%), which are used without considering their indications and contraindications (interdental spaces occupied by the papilla). The dental floss, which is indicated to be used by the majority of the patients included in the study group is used by a low proportion (20,21%) of subjects.

The practical conclusion of those findings, in concordance with other previous personal studies [16] suggests the necessity of explaining of the importance and purpose of using the secondary methods for plaque control by all the patients, adapting the type of the secondary device to each clinical situation.



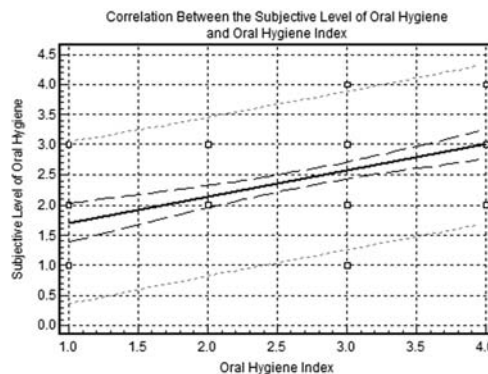
Graphic nr.3

Considering the grades of the oral hygiene status based on the values of the OHI used in the literature [6] we have given to the subjective evaluation of oral hygiene the following values intervals of OHI: OHI value between 0-0,5-**excellent** oral hygiene; OHI value between 0,6-1,2-**good** oral hygiene; OHI value between 1,3-3-**satisfactory (fair)** oral hygiene; OHI value between 3,1-6-**poor** oral hygiene.

The same grades are mentioned at question number 11 of the questionnaire, regarding the appreciation of the patient of its oral hygiene status. Comparing statistically the subjective and objective evaluation of the oral hygiene (Student test) a good correlation was set, with $r = 0,4765$, critical value 0,2673, or according to the Spearman's rank correlation coefficient $r = 0.4765$, $P < 0,0001$ (graphic nr.4). This data suggest the objectivity of the patients regarding their oral hygiene.

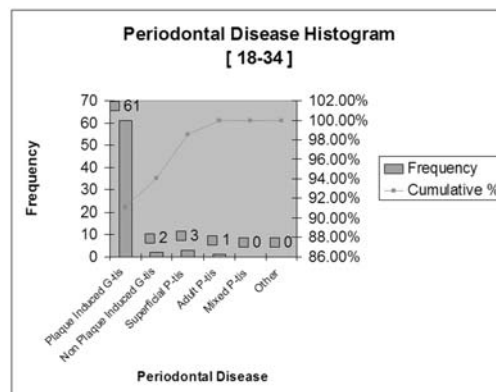
The negative effects of the smoking over the periodontal health are well known and recognized in the literature, but there are contradictions regarding the relation between smoking and calculus accumulations, as component part of the oral hygiene. Bergström (2005) found a direct correlation between smoking and subgingival calculus deposits connected with the age and oral hygiene preoccupation of the patients [5]. Other studies -Martinez-Canut (1999) do

not find positive correlations between those variables [5]. In this study the oral hygiene was assessed separately dividing the total group of patients into smokers and non-smokers. Both groups have a normal distribution (Kolmogorov-Smirnov test). The group of non-smokers is sensible higher as percentage 54,25% than the smokers. The mean value of OHI in smokers is 2,0976, $P = 0,059$, sensibly higher than in non-smokers: 1,9558, $P = 0,373$. We could not give a statistical significance to those values, concluding that in our study group the oral hygiene it is not correlated directly with the smoking habits.

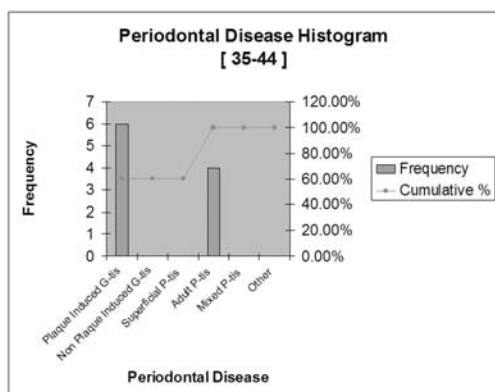


Graphic nr.4

The distribution of the periodontal diseases on each age group was compared, obtaining the following results:

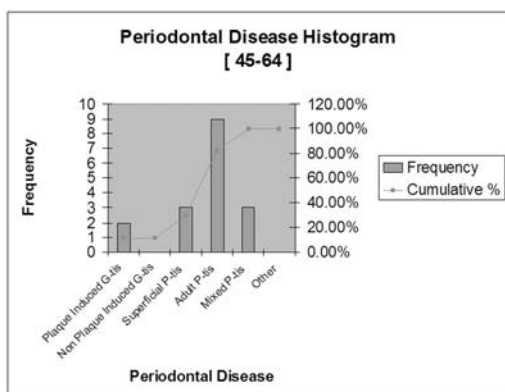


Graphic nr.5



Graphic nr.6

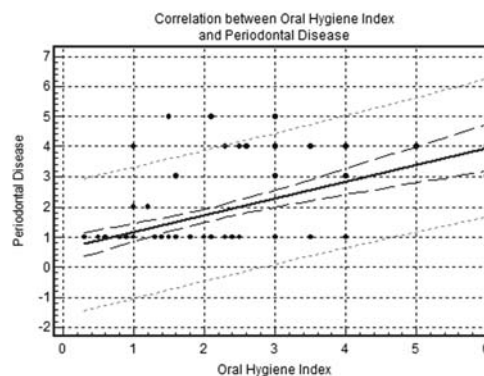
From graphic nr.5 it can be seen the main proportion has the plaque induced gingivitis (61 subjects, 91% from the first age group). This clinical form is reversible with a correct treatment, associated compulsory with the improvement of the plaque control methods. Among the second age group (graphic nr.6) plaque induced gingivitis is still the most common form of disease 60%, but the adult periodontitis is present in a pretty high proportion-40%.



Graphic nr.7

At the third age group the majority of subjects exhibit adult periodontitis-52,94%, followed by equal cases with mixed and superficial periodontitis 17,64%. In these patients the periodontal therapy became more complex, but the correctitude of plaque control methods is the key of therapy success [8,24].

Comparing the connection between the OHI and the periodontal involvement we found in case of patients exhibiting plaque-induced gingivitis an OHI average 1,63, more reduced than the OHI average of the patients with superficial periodontitis - 3,60 and OHI average of patients with adult periodontitis -3,35. Both OHI values of patients with periodontitis prove a poor oral hygiene in this category of patients. Spearman's rank correlation coefficient $r = 0.504$, $P < 0,0001$ shows positive statistical correlation of those variables (graphic nr.8), in concordance with most of the literature studies [4,10,21].



Graphic nr.8

Conclusions

The majority of this study group is occupied by the young adults and consequently the plaque-induced gingivitis is predominant as periodontal pathology. The oral hygiene status of the subjects is directly correlated with the subjective affirmation of the patients and with the correctitude of using manual tooth brushing and only in low proportion the electric one, as principal method of plaque removal. From the secondary methods of plaque control, the dental floss (which is the most indicated in patients without retractions) is used by a low proportion of the patients (20,21%), but the majority use the tooth picks which are the less

indicated in this case. Although harmful for the oral health, smoking is not directly correlated with plaque and calculus depositions. The adult periodontitis occurs with the

age, predominant as proportion in the third age group and is directly correlated with the level of oral hygiene.

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