EVALUATION OF THE PREVALENCE OF THE PERIODONTAL DISEASE *VERSUS* SYSTEMIC AND LOCAL RISK FACTORS

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Abstract

Introduction: The periodontal disease represents a malady characterized by an extremely high incidence. The manifestations and evolution of the periodontal diseases vary for each form in part, being influenced by systemic and local risk factors. **Scope of the study**: To evaluate the periodontal status on a group of patients, *versus* the systemic and local factors. **Materials and method**: The study was performed on a group of 170 patients, whose odonto-periodontal status was evaluated by strict clinical and paraclinical examinations, on establishing the inflammation indices and the periodontal diagnosis. **Results**: The main cause of the analysis was gingival bleeding; an increased number of smokers was registered among the patients. Out of the local factors, especially important were edentations and malocclusions. Also, a higher number of aggressive generalized periodontites has been noticed. **Discussion**: The forms of the periodontal diseases are obviously influenced by the systemic context, while the forms of localized chronic periodontitis associated with generalized chronic gingivitis reflect the role played by the local risk factors. **Conclusions**: Stress and smoking represent significant risk factors in the installation of periodontal pathology, with a really alarming prevalence. The aggressive forms of periodontitis showed a higher frequency than that recorded in literature.

Keywords: *periodontal disease, systemic risk factors, local risk factors*

INTRODUCTION

Gingival and periodontal diseases are manifested at global level, in all populations subjected to investigations [1]. The clinical signs of periodontal destruction may appear at any age, the data demonstrating the existence of populations resistant to periodontitis being extremely scarce. The periodontal disease is an inflammatory affection of destructive type, whose main factor in its etiology is, apart from other numerous favourizing local and general causes, the bacterial plaque. The periodontal disease may appear in various forms, over a large manifestation area, starting from tissular affection up to destruction of the periodontium, which, in certain cases, may lead even to tooth losses [2,3].

The periodontal pathology is characterized by gingivitis, periodontitis, periodontal manifestations caused by certain systemic problems, its manifestation and evolution varying for each form in part. The irritative, functional factors affect the general condition of the organism, modifying its defense capacity and, even if failing to initiate the destructive process, accelerate its progress and ratio of tissular destruction [4,5].

The bacterial plaque appears as the main etiological agent, however, the systemic and local factors capable of modifying the response of the periodontal tissues to plaque deposition may be identified by anamnesis and strict clinical examination [6]. Numerous systemic factors of risk may modify the effect of the plaque upon the host. The environment and the genetic factors will influence the microbe-host equilibrium [7,8]. Among the systemic factors that may influence the periodontal disease, mention should be made of cardiovascular affections, diabetes, endocrine disorders, obesity, metabolic diseases and even digestive and renal maladies [9-12].

Smoking represents a risk factor of both systemic and local nature, involving an extremely complex mixture, of over 4,000 substances which contain carbon monoxide, hydrogen cyanide, oxygen radicals, an increased number of carginogenic compounds and the main addicted

molecule – nicotine [13], rapidly absorbed at lung level. Administration of nicotine increases blood pressure, heart frequency, breathing frequency, while decreasing the temperature of the teguments, as a result of peripheric vasoconstriction. Nevertheless, in other sites, such as, for example, striated musculature, nicotine induces vasodilatation. The mechanisms of the adverse effects induced by smoking have been established, however, their exact molecular paths are still to be identified [14].

Chronic stress induces negative effects on the efficiency of the immune response, on also influencing the host-microbial aggression equilibrium [15]. Stress diminishes the salivary flux, favoring the formation of bacterial plaque, while emotional stress modifies the pH and composition of saliva [16]. It has been also demonstrated that stress is associated with higher crevicular IL-1b levels.

Age, sex, education level, the socio-economic condition, the systemic maladies, genetic predisposition represent systemic factors intervening in the occurrence and evolution of the periodontal disease. To all these, favourizing local factors may be associated, such as a scarce oral hygiene, the scale, edentations, malocclusions, parafunctions, or the incorrectly applied odontal, prosthetic, surgical, orthodontic treatments. Thus, to obtain a correct general image of the periodontal status *versus* the systemic context and the local factors, as well as for a correct and complete approaching of the patient, all these data should be carefully collected, prior to the elaboration of an adequate and individualized treatment plan [17-19].

SCOPE OF THE STUDY

The scope of the study was to evaluate the periodontal status, together with the systemic and local risk factors, on a group of 170 patients.

MATERIALS AND METHOD

The investigation was performed between February and June 2013, in the Clinics of Periodontology of the "Gr.T. Popa" UMPh, Iaşi. The experimental group was formed of 170 patients, subjected to a minute clinical examination. The periodontal diagnosis was based on specialized and also on additional (*i.e.*, radiological: retro-dento-alveolar images and ortopantomographies, photografic images for documentation) examinations.

Anamnesis of the patients provided important information on the grounds of the presentation, medical history of the patients, living and working conditions, possible vicious habits, while the dental clinical exam offered data on the odontal and periodontal status, and on the local factors favorizing the development of the periodontal disease. The indices of periodontal inflammation have been also evaluated. There followed initiation of a specialized treatment, according to the established requirements (instructions of oral hygiene, scaling-levelling, debridement). All obtained data were recorded in specialized files.

The obtained data were analyzed and statistically processed with the PASW Statistics 18 and Microsoft Excel programs.

RESULTS

The investigation was performed on an experimental group of 170 patients (101 males and 69 females) who addressed the Clinics of Periodontology of the "Gr.T. Popa" UMPh, Iaşi. As to its distribution on groups of age, the 21-30 year category was of majority (68.23%) (Fig. 1).

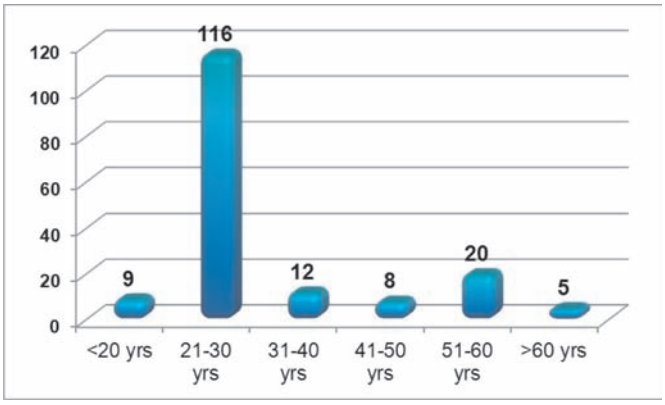


Fig. 1. Distribution of subjects on groups of age

Most of the patients (66.47%) complained of gingival bleeding. Among the main sufferings of the patients, mention should be made of coronary odontal lesions (LOC), halitosis, increased

amounts of calculus, functional disorders caused by dental mobility and by the presence of recessions, gingival pruritus and dental hypersensitivity (Fig. 2).

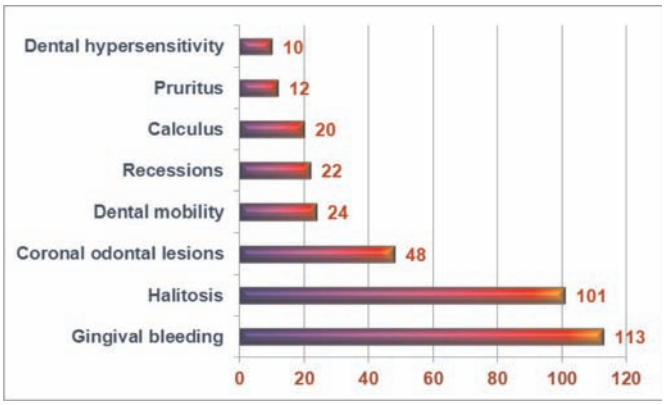


Fig. 2. Distribution of the motives of patients'addressing the dentist

Out of the systemic maladies observed, an important part was held by cardiovascular diseases (20 cases, of which 13 with arterial hypertension). Also registered were 6 cases of digestive affections (gastritis – 2, gastric ulcer – 1, duodenal ulcer – 1, gastro-oesophagian reflux – 2), 4 cases with neurological diseases (2 with schizophrenia and 1 with epilepsy), 4 cases of diabetes (1 of type I and 3 of DZ type II) (Fig. 3).

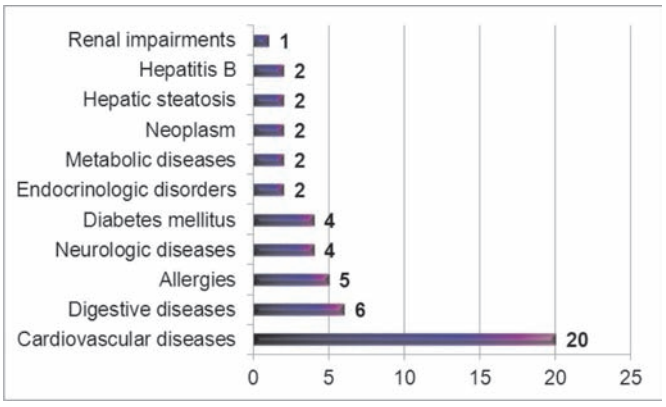


Fig. 3. Distribution of associated systemic affections on cases

At the level of the experimental group, 42.94% of the patients were smokers (73 persons, among which 13 chronic smokers) and 17.05% were subjected to psycho-social stress.

Among the local favourizing factors, an important role was held by malocclusions (15 patients Class II Angle, 5 Class III-a Angle), as well as by the presence of edentations (34 patients with partially reduced edentation, 12 with partially extended edentation) (Fig. 4).

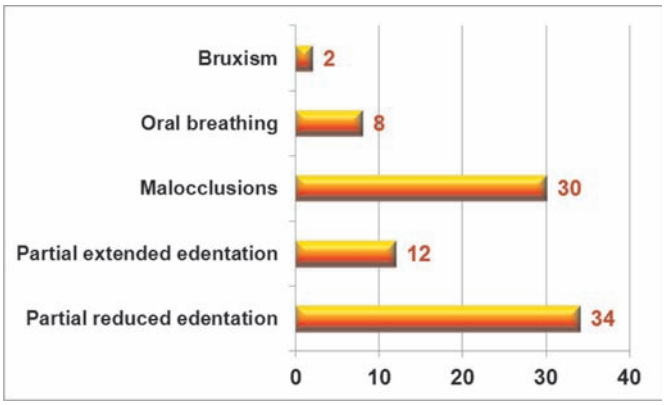
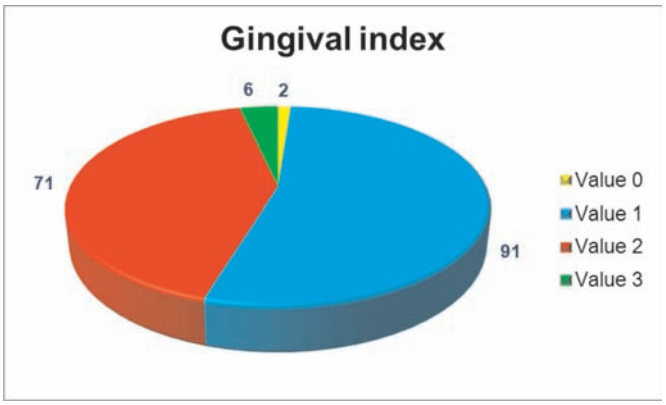
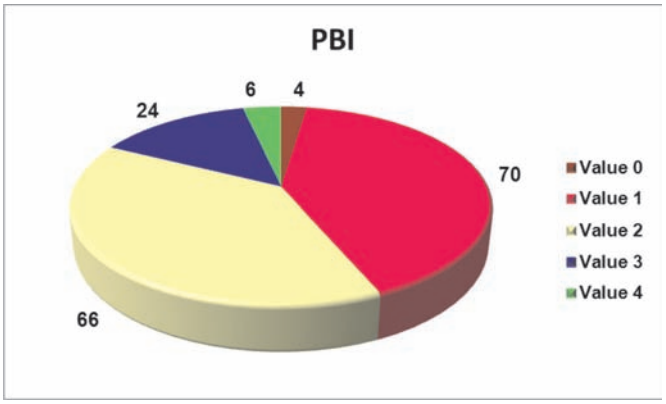


Fig. 4. Distribution of local favorizing factors on number of cases

In the case of the Silness and Löe Gingival Index, predominance of values 1 and 2 (91, respectively 71 cases) was observed; the same values are also reflected by the bleeding indices (PBI and SBI). Figure 5 (a,b,c,d) shows the values of the periodontal indices here under analysis.



a)



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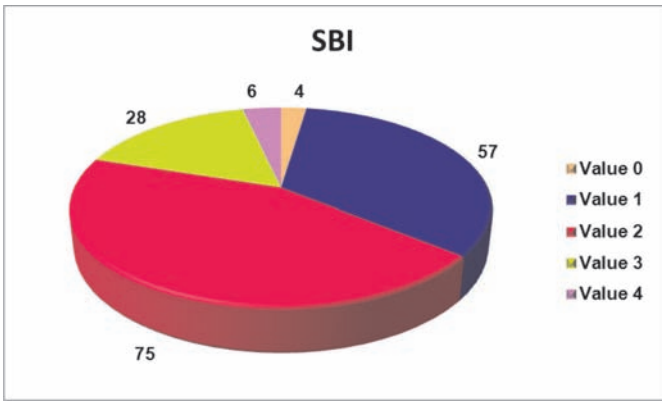
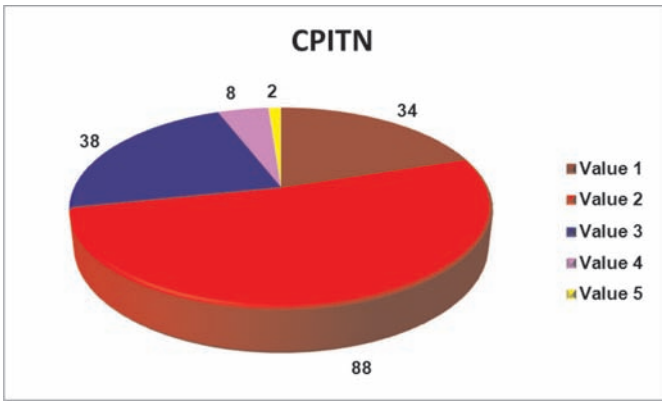


c)



d)

Fig. 5 Distribution of gingival indices on number of cases: a) GI; b) PBI; c) SBI; d) CPITN

31 cases with different degrees of dental mobility (12 cases with degree 1 mobility, 16 with degree 2 mobility and 2. 3 cases with degree 3 mobility 3) and 48 cases with periodontal recessions were recorded. Also, 22 cases with gingival overgrowths (12.94%; 14 cases with degree 1 overgrowths and 8 cases with degree 2 overgrowths) were discovered.

As to the periodontal diagnosis, an increased number of cases of generalized chronic gingivitis and generalized chronic periodontitis was discovered (Table 1).

Table 1. Distribution of periodontal diagnosis on number of cases and percent values

Periodontal diagnosis	Number of cases	Percent ratio
Localized chronic gingivitis	14	8.23%
Generalized chronic gingivitis	51	30.00%
Localized chronic periodontitis	6	3.53%
Generalized chronic periodontitis	51	30.00%
Localized chronic pe rodontitis associated with generalized chronic gingivitis	38	22.35%
Generalized aggressive periodontitis	10	5.89%

Periodontal diagnosis	Number of cases	Percentage
Chronic localized gingivitis	14	8,23%
Chronic generalized gingivitis	51	30.00%
Chronic localized periodontitis	6	3.53%
Chronic generalized periodontitis	51	30.00%
Chronic localized periodontitis associated with chronic generalized gingivitis	38	22.35%
Generalized aggressive periodontitis	10	5.89%

DISCUSSION

In the present study, the prevailing group of age was represented by young adults (125 patients under 30), an aspect reflecting the increasing interest for their odonto-periodontal status among the youths; also, the main cause was gingival bleeding, known as being one of the first signs of periodontal inflammation.

Medical history may provide significant data, for both the therapeutical conduct and identification of the systemic risk factors. Development and advance of the periodontal disease in a patient are ”individualized” by a number of endogenous and exogenous factors. Evaluation, understanding and an adequate management of such factors facilitate prevention or control of the disease, when a certain periodontal affection is manifested [13]. The bidirectional character between the periodontal disease and a series of systemic pathologies (cardiovascular diseases, diabetes mellitus, endocrine maladies, obesity, etc.) is well-known. In the present study, an important part was held by the cardiovascular diseases (30 cases).

A series of environmental factors and some vicious habits may appear as important risk

factors for the progress of the periodontal disease. One of them is stress. The stressing events characterizing the social and occupational environment showed their capacity of influencing the organism at the level of certain systems, such as the endocrine or immune one, thus inducing systemic modifications [20]. Association of stress with other maladies is more powerful in the case of infectious, inflammatory pathologies, also affecting the healing processes [21]. In the present study, a significant number of patients declared that they suffer from psycho-social or occupational stress (17.05%). The mechanisms through which the psycho-social stress may affect the periodontal status are complex, one of the suggestions put forward being that one of the plausible causes may involve behavioural modifications, leading to smoking and to a scarce oral hygiene. Numerous studies have evaluated the connection between stress and the periodontal disease. Linden *et al*. [22], who analyzed the association between occupational stress and the advance of periodontitis, reported that the longitudinal loss of periodontal attachment may be considerably influenced by age, socio-economic condition, professional insatisfactions and an A-type personality (characterized by aggressive, impatient, irritable behaviour). In a recent study, Breivik *et al*. [23] demonstrated that depression, experimentally induced in mice, accelerated the tissular breakdown in animals with periodontitis induced through ligatures, while the pharmacological treatment of depression attenuated it.

An important number of subjects (73) declared that they are smokers. The higher risk, in smokers, for periodontal lesions has been confirmed by numerous studies [24-26], the values recorded being four times higher than in the case of non-smokers. Such data suggest some dose-effect relation between the number of cigarettes smoked daily and the susceptibility to periodontitis. It is estimated that more than 40% of the cases of periodontitis in adults may be attributed to daily smoking. Clinically relevant is the observation that smoking interferes with healing of lesions after levelling and debridement [27,28], periodontal surgery and procedures of guided bone regeneration [29].

The occlusal trauma describes the pathological or adaptative modifications occurring at periodontal level as a result of certain non-physiological forces. More than that, such forces may also induce traumatic effects at the level of temporo-mandibulary joint, musculature and pulp tissue. The traumatic forces may act upon a single tooth or on a group of teeth occurring in premature contacts; also, they may appear in association with certain parafunctions, *e.g*., bruxism. Occlusal trauma cannot determine *per se* the manifestation of the periodontal disease, however it remains a dangerous factor of risk. During the evaluation of the odonto-periodontal status performed in the present study, several subjects evidenced various types of malocclusions (30 cases out of a total number of 170).

Even if the main diagnosis involved generalized chronic gingivitis or generalized chronic periodontitis (representing 60.00% of the cases), a frequent association of localized chronic periodontitis with generalized chronic gingivitis was observed. In such situations, especially important is the role played by the local risk factors in the evolution of the periodontal disease. Equally, a higher number of generalized aggressive periodontitis was recorded. A review on this topic reached the conclusion that the aggressive forms of periodontitis have a low prevalence in most regions of the world, representing only 0.1-1% at populational level [30]. According to the present study, the percent ratio recorded was much higher (5.89%), which may be explained, among others, by the large number of young patients considered for analysis.

The present study is a cross-sectional one, analyzing the periodontal status of the patients in a certain moment. The lack of heterogenicity on groups of age represents another limitation of this investigation, so that further longitudinal analyses, aimed at evaluating the evolution, in time, of the patients subjected to treatments, are necessary.

CONCLUSIONS

Most of the subjects included in the study are young, with ages under 30. The main cause of the analysis was gingival bleeding. Stress and smoking represent significant risk factors in the

installation of periodontal pathology, with a really alarming prevalence. The aggressive forms of periodontitis showed a higher frequency than that recorded in literature.

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