

UNIVERSITY OF MEDICINE AND PHARMACY OF CRAIOVA  
DOCTORAL SCHOOL

THE CLINICAL, HISTOLOGICAL AND IMMUNOHISTOCHEMICAL  
STUDY OF PERIODONTAL CHANGES IN FIXED AND MOVABLE  
DENTAL PROSTHESES WEARERS

ABSTRACT

PhD COORDINATOR:

PROF. UNIV.DR.LAURENTIU MOGOANTA

PhD STUDENT:

CROITORU MIRELA LUCIA

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**Key words:** dental organ, periodontium, dental prostheses, periodontal disease, gingival mucosa

## **Introduction**

Periodontal tissues disease has been reported from ancient times.

Modern medicine attaches great importance to the potential of periodontal disease to influence the systemic evolution as research conducted aim at eliminating specific infections through treatments.

Dental bridges are fixed on abutments by the retention elements represented by various microprostheses which thus become aggregation elements of the construction. In other words, the essential requirement in these elements is that they do not irritate the marginal periodontium.

Between prosthetic restoration and marginal periodontium there should be a relation of "mutual protection" or at least "mutual respect".

## **Chapter I. Odontium – morphological aspects**

A dental organ (*organum dentale*) means a complex of tissues structured differently but harmonized morphologically and functionally to receive, absorb and transmit masticatory pressures (Bratu D, 1997).

The **dental organ** or the **odonton** consists of 2 components:

- *odontium* or the masticatory component and
- *periodontium* or the support component (Banita M, 2006).

The odontium comprises in its structure: hard tissue (enamel and dentin) and soft tissue (dental pulp) and periodontium has the following components: supporting tissues (cementum, alveolar bone and periodontium) and coverage tissues (gum) (Bratu D, 1997).

## **Chapter II. Periodontium - histological structure**

**Periodontium** is a component of the dental organ consisting of all the tissues maintaining and supporting the anatomic tooth, tissues located in a complete anatomical and physiological interdependence (Borghetti A. et al, 2000). All the periodontal components work in interdependence biologically, because an aggression with dysfunctional consequences on one of the components also has consequences for the other (Borghetti A. et al, 2000).

Periodontium may be separated into two major components:

- marginal periodontium
- apical periodontium.

### **Chapter III. The periodontal disease**

The destructive bone lesions of the marginal periodontium were identified through modern means of investigation in embalmed mummies, 4,000 years ago in ancient Egypt.

In our country, the first writings about the care of gums by brushing and using dentifrices date from 1828 and they are attributed to Selingher.

Periodontal diseases are the result of bacterial aggression that triggers inflammation and mobilizes the immune system. Initially, the form of periodontal disease begins with a gingival and dental sulcus colonization by bacteria, the enzymes thereof modifying the sulcular epithelium by increasing permeability. The underlying vascular and cellular systems react by inflammation of the gum as a first stage of the disease (Schroeder HE, 1986).

#### Chapter IV. Research aims and objectives

In this study, I decided to accomplish a clinical research then continued with a microscopic morphology research work, namely, a histology (histopathology) research completed with immunohistochemical research work and radiological examinations on the entire group of patients, wearing dental prostheses fixed and partially movable, that show macroscopic changes of the marginal periodontium of abutments.

The subjects who will be involved in the study will be selected among the patients that resort to services of the private dental office.

Chapter V. The clinical study of periodontal changes in fixed and movable dental prostheses wearers

### **MATERIAL STUDIED**

The patients subject to our study were selected from a total number of 145 persons wearing fixed and movable dental prostheses who came to the dental office,

with a pathology either at the level of the abutments or complaining of gingival bleeding in the area of the partially movable retention elements.

### **Working Method**

The methodology for the examination of the periodontitis patient consists in three main stages:

1. The anamnesis - in which data regarding the disease are reported by the patient;
2. The objective clinical examination - performed by inspection and palpation, resulting in a diagnosis of certainty or in a presumptive diagnosis;
3. Complementary examinations - which contribute to the diagnosis, to choosing the most effective prophylactic and therapeutic measures.

Data from each examination were computerized and updated

For every patient who has accepted further investigations in the study, I have established a *personal examination record* taken and adapted from the model proposed by prof. Dumitriu HT (Dumitriu TH. 2006) .

### **RESULTS**

After examining the data in the questionnaires filled in by patients and in the periodontics examination sheet, I corroborated the data with those obtained from the clinical examination and the laboratory findings and I noticed a variety of symptoms and degrees of periodontal damage depending on the type of prosthetic device worn, on the material it is made of, how it was designed and made in terms of technology, and last but not least the gingival profile of the patients and their concern for oral hygiene.

Following the clinical examination, patients with fixed prostheses had plaque on the dentures that were incorrectly adjusted.

Patients wearing dental prostheses older than 10 years have large deposits of tartar. Gingival hyperplasia is noted at the interdental papillae level, pedicle or sessile type, depending on the cervical adaptation manner of the denture worn correlated with the patient's age and the hygiene.

The inflammation of the gingival gum varied depending on the profile, the type of prosthesis, the presence of dental plaque and tartar on the surface of the denture.

### **Discussions**

Clinical outcomes reported in this paper, after examining the patients wearing fixed and partially movable dental prostheses included in the study group largely correspond to those in the literature.

From the viewpoint of the association of periodontitis with age, studies in large groups of patients show that the frequency of the disease is almost equal in relation to sex (P. Axelsson et al, 2004), while in our country it was found that periodontal pathology is more common in men than in women (Dumitriu HT, 2006). The entire range of periodontal diseases is present in adults, thus the period of life in which profound chronic marginal periodontitis, localised in nature, develops, along with forms of progressive evolution in an increased number of teeth, with the trend of generalization in adults up to 40 years old.

Chapter VI. The histological study of periodontal changes in fixed and movable dental prostheses wearers

### **Material and Methods**

The biological material used in our study was represented by the marginal and superficial periodontium collected from patients with fixed or movable prostheses who showed 2<sup>nd</sup> and 3<sup>rd</sup> grade pathologic tooth mobility (36 patients) who required dental extractions. After performing the tooth extraction, the wound was cleaned, and small pieces of periodontal tissue were collected for histopathological study. Moreover, superficial periodontium was collected from patients with prostheses older than 10 years (18 patients) who showed gingival hyperplasia of the sessile or pedicle type, caused by the dental prosthesis. Before conducting the dental treatment and collecting the biological samples, informed consent was obtained for all patients.

## **Results**

The microscopic study of the preparations made by us showed the presence of significant changes of the periodontium in both groups of patients with periodontal (with fixed or movable prostheses). The changes of the epithelium coverage were frequently accompanied by significant changes in the underlying chorion so that, overall, the entire gingival mucosa showed histopathological changes.

Among the cells belonging to the immune system, the most numerous were lymphocytes. The presence of lymphocytes in the periodontal inflammatory focus is due to the fact that there are mobile cells with highly active locomotion movements, comparable to those of neutrophils.

Although no classical staining could be identified in the two types of lymphocytes (T and B), we believe that both types of lymphocytes were present in the periodontal inflammatory foci.

Other cells belong to the inflammatory system, present in large numbers in the corium were plasma cells.

In one patient we found an inflammatory infiltrate composed mainly of coarse acidophil plasmocytes (MOTT cells) and neutrophil granulocytes. The patient may have had a parasitosis or an immunoallergic disease associated.

Vascular changes were present in all patients enrolled in the study. Blood vessels in the structure of the marginal and coverage periodontium are represented by arterioles, capillaries and venules originating in the suprapariosteal arterioles, the periodontal ligament vessels and the interdental septa arterioles.

## **Discussions**

Prosthetic restorations cause various mechanical requests in the exercise of functions and parafunctions by the maxillary due to forces acting on the maxillary.

The maxillary has the functional ability to absorb demands when they fall within functional limitations. If requests exceed the functional limits, the effort to adapt the maxillary arises, which may offset or not the excess load (Gaşpar I, Cutui M, Bîcleşanu C, 1995). The inability of the maxillary to adapt to the exaggerated demands obviously leads to the failure of some of its components (crowns, periodontal) with the occurrence

of consecutive pathological phenomena. In this regard, the most important objective of prostheses is to provide the most physiological transmission of a request in terms of direction, intensity, frequency so as to achieve minimal adaptive changes (Bratu D, Nussbaum R, 2001).

More than 700 bacterial species or phenotypes have been identified by molecular techniques in the oral cavity, (Aas JA, Paster BJ, Stokes LN, Olsen I, Dewhirst FE, 2005), and over 24 species of bacteria have been identified in the subgingival plaque in patients with chronic periodontal disease, bacteria which may be responsible for the onset and maintenance of periodontal disease. (Dahlen G, Leonhardt A, 2006).

### **Conclusions**

The patients under study had recently deposited plaque, at least at the level of the prosthetic arcade, due to the temporary removal of oral hygiene for reasons of painful symptomatology.

Some authors consider that the prosthesis is a risk factor for the occurrence of periodontitis, although restoration strictly complies with all the rules in this field, because, after several years, fixed or movable dentures cause gingivitis and a bacterial plaque worst than the usual, due to changes in local conditions (Al-Wahadni A, Linden GJ, Hussey DL, 1999).

According to the clinical and histological aspects noted in patients who developed gum disease, who had fixed and movable dental prostheses, we can say that periodontal disease has an unpredictable evolution, difficult to control and a poor prognosis. Histological changes are very extensive and they can persist long after the clinical disease appears to be resolved.

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