

# **A STUDY OF PERIODONTAL DISEASE IN CHILDREN AND ADOLESCENTS WITH TYPE 1 DIABETES**

## **SUMMARY**

### **INTRODUCTION**

Marginal periodontium is the seat of acute and chronic diseases that pose a particular problem in general pathology of these diseases human. The susceptibility to this disease is variable, depending on the host response to periodontal pathogens. Although bacteria causes an induced inflammatory periodontal disease plaque, clinical disease progression is influenced by genetic acquire factors that can alter susceptibility to infections.

Diabetes is a metabolic syndrome characterized by hyperglycemia and disturbances bet on carbohydrate metabolism, protein and fat. Type 1 diabetes mellitus is determined both by genetic and environmental factors (mainly bet on childhood viral infections that destroy insulin-producing cells in the pancreas).

We emphasize reciprocity in relation to diabetes, periodontal disease. Diabetes has a negative effect on the incidence and progression of periodontal disease and periodontal disease in diabetic patients with blood glucose control is achieved marginal harder. In the early 1990s periodontitis has been called "the sixth complication of diabetes" (Loe H. 1993), and in 2003 the ADA (American Diabetes Associations) said that periodontal disease is often found in people with diabetes. In 2011 ADA guide includes dental examination in the evaluation of diabetes

Lately has put great emphasis on the relation "two-way" between diabetes and periodontitis, establishing that diabetes is a risk factor for periodontitis and periodontitis may have a negative effect on glycemic control.

**KEYWORDS:** periodontal disease, dental injuries, type 1 diabetes, glycosylated hemoglobin, glycemic control.

## **KNOWLEDGE**

In the first chapter we presented data on marginal periodontal structure, with its anatomical limits, discussing separately the two components: marginal periodontium superficial or deep marginal periodontium cover or support. The second chapter describes periodontal disease in terms of etiology and pathogenesis, being exposed and different classifications of periodontal diseases and diagnostic criteria. The third chapter presents the definition of diabetes, etiopathogenesis and fiziopatogenic disease, diabetes classification, evolution and complications of the disease, clinical manifestations and management of type 1 diabetes, followed by a chapter that discusses the relationship between periodontal disease and diabetes since the association between these two diseases is considered to be bidirectional given that diabetes is a risk factor for periodontitis with gingival inflammation produced microbial flora exacerbated and exaggerated immune response and determining a while periodontitis may worsen the health of patients with diabetes diabetes increasing the amount of glucose in the blood over the normal limits as .

## **PERSONAL CONTRIBUTIONS**

Chapter V of the thesis presents a clinical-statistical study on possible correlations between periodontal status and clinical dental parameters characteristics for patient with type 1 diabetes and periodontal disease.

### **Aim of the study**

The aim is to establish and highlight possible correlations between parameters characteristic disturbance of carbohydrate metabolism, the main forms of periodontal disease and dental injuries. Thus, given the purpose of the study, the present research assumes that the use of new approaches, in addition to those already known, the correlations between diabetes and periodontal disease, rather briefly discussed in the literature, may have repercussions in medical practice, by evaluating them better seen as two diseases can influence each other in terms of symptoms manifested and treatment success.

### **Objectives:**

- Identify patients type 1 diabetes and periodontal disease given that diabetes is a risk factor in the development and progression of periodontal disease marginal;
- Establish new correlations between stages of periodontal disease in children and adolescents with a wide range of expressions (from the simplest form represented by gingival tissue damage to various forms of periodontal destruction, which may lead to tooth loss in some cases) and diabetes-specific parameters;
- Studying correlations between age of onset of type 1 diabetes and type of periodontal disease occur; HbA1c assessment in relation to severity of periodontal diagnosis
- Establishing relationships between the number / type of dental lesions and diagnosis of type 1 diabetes.

#### Materials and methods

The study was conducted on two groups of patients, the subjects showed a lot of type 1 diabetes and certain dental and periodontal changes and a second group of patients with a dental and periodontal diagnosis in the absence of diabetes.

All patients were informed in advance about the purpose and methods of investigation needed to carry out this study, which has complied with the Ethics and Scientific Ethics University and the University of Medicine and Pharmacy of Craiova.

Including assumed the existence of diabetes patients at least 6 months and dental injuries / periodontal. From group were excluded patients whose data were inaccessible, incomplete or not they agreed with study participation.

Each patient was followed the onset of the disease, and at that debuted disease, age of diagnosis of diabetes, disease progression, and record HbA1c, namely the average values over the last year. Clinical evaluation of dental and periodontal patients were performed in Department of Periodontology, Faculty of Dentistry, University of Medicine and Pharmacy of Craiova. Findings dental and periodontal status was achieved by a general clinical examination, laboratory local

investigations. All patients in these groups were drawn observation forms that included anemneza and clinical examination.

The data were recorded for each patient: sex, age, age at onset of type 1 diabetes, HbA1c, gingival sulcus probing depth, number of teeth with periodontal pockets exceeding 6 mm, plaque index, number and type of dental injuries.

Clinical examination of the oral cavity emphasized:

- inspection and palpation of superficial marginal periodontium and periodontal support, following changes color, volume, consistency, integrity and pathological changes on integration junction epithelium and gingival retraction (measured in mm on all sides of the tooth);
- probing the gingival sulcus, with detection of presence and / or deep sites;
- presence / absence of gingival bleeding - spontaneous or induced
- presence / absence of pathological tooth mobility
- detection of dental changes that may be associated type 1 diabetes and periodontal disease:
  - dental tartar,
  - decay approximated to vanquish the contact point,
  - cavities package
  - unfair treatment
- type of dentition.

We used paraclinical investigation - Silness and Loe plaque index.

The analysis of these parameters measured in all patients in the test and control groups, was diagnosed with gingivitis or periodontitis aggressive according with 1999 AAP criteria.

Following statistical analysis of data obtained from patients studied groups we obtained an index  $p$  - (reference parameter) and  $r > 0.6$   $p < 0.05$  value, resulting in a statistically significant correlation between HbA1c values and periodontal diagnosis.

## Results

Significant differences were established IP value between adults and children, as follows: group indices plate adults with diabetes and periodontal disease is higher than the control group indices calculated for adults indices plate control group of adults is less than those found in the control group of children, resulting  $p < 0,05$ .

In terms of periodontal calculated for adults and children of the same group (test or control), after statistical analysis found no statistically significant differences,  $p > 0,05$ . A significant correlation was found statistically between number of teeth with periodontal pockets greater than 6mm and age of diagnosis of diabetes.

An inverse correlation of statistically was highlighted by the age of diagnosis of diabetes and the maximum probing depth (which indicates the severity of periodontal diagnosis), but HbA1c values between and severity of periodontal diagnosis in children (GTC) could not establish any connection. Is statistically significant correlation between HbA1c values and periodontal diagnosis in adults (GTA).

In terms of dental we found that patients with type 1 diabetes had a greater number of lesions such as CI, CC and / or DC, unlike patients in the control group, which may be related to diagnosis diabetes.

Chapter VI is devoted to a study of correlations between factors and glycemic control in type 1 diabetes in children and adolescents.

### Aim of the study

Identifying correlations between factors and glycemic control in children with type 1 diabetes is the main purpose of this study. The research aimed epidemiological aspects in children with type 1 diabetes and has the following main objectives: correlations between glycemic control and epidemiological aspects, correlations between clinical parameters (represented by the weight, height and IMC) and glycemic control, correlations between different stages of puberty (Tanner)

and glycemic control, correlations between duration of type 1 diabetes and glycemic control, correlations between family issues (education level, family type) and glycemic control, correlations between the embodiment of the diet and balance glycemic correlations between physical activity and glycemic control of patients, correlations between the practicalities of insulin therapy and glycemic control.

## Materials and methods

The study was conducted on a group of patients diagnosed with type 1 diabetes, registered and monitored in Clinic Pediatric Emergency County Hospital Craiova. Including children in the study was performed after a legal representative (parent or guardian) has been informed about the purpose and method, and after consent is obtained from it, in accordance with the regulations of the Ethics Committee of Emergency County Hospital Craiova . The study was based on a questionnaire, which was completed by the legal representative.

## Results

The relationship between HbA1c and age groups, we found that age group from 7 - 12 years is 72% of patients with glucose imbalance ( $HbA1c > 7.50\%$ ).

The relationship between HbA1c and area of origin has shown that rural areas was a significant risk factor, positive predictive for the occurrence of glycemic imbalance.

Depending on pubertal stage, it was observed that 62% of patients had values Tanner 1  $7.50\%$  HbA1c over 53% of patients Tanner 2-4 HbA1c values were above  $7.50\%$ , predominantly patients Tanner type 5 73% who had HbA1c values above  $7.50\%$ , with strong statistical significance the relationship between HbA1c and duration of the T1D development demonstrates that glycemic imbalance occurs in the first year of evolution.

After analyzing the relationship between HbA1c and frequency of blood glucose measurements, we found that 81.82% of patients undergoing  $<4$  measurements / day, have been in glycemic imbalance, while only 18.18% were found in glycemic control; on the other hand, of those exercising  $\geq 4$  determinations / day, 56.67% were found in glycemic imbalance, while 43.33% were found in glycemic cont

## **FINAL CONCLUSIONS**

1. Currently it is widely accepted that periodontal disease is an inflammatory disease of microbial origin that affects a significant number of the population. Although these diseases, diabetes and periodontal disease are different medical entities, they aggravate each other biochemical mechanisms at the cellular and molecular systemic factors that affect the overall condition of the body, and may have an adverse effect on periodontal tissues.
2. The results show significant differences ( $p>0.05$ ) between GMA and GTA PI, however the number of cases of periodontitis is higher compared to GTA and GMA this demonstrates the involvement of metabolic changes caused by type 1 diabetes in developing and development of periodontal disease.
3. Our results show that there is, in statistical terms, a direct correlation significant between the number of teeth with periodontal pockets exceeding 6 mm and T1D, which supports the hypothesis that maintaining metabolic disorders for more long lead to alterations in periodontal status with the emergence of a large number of pockets.
4. From the group of adults, gingivitis showed approximately 33.34%, while 66.66% of those examined showed a form of periodontitis, this may represent a significant correlation with HbA1c values.
5. In our study we found an inverse correlation statistically significant ( $p<0.05$ ) between age of onset of T1D and maximum probing depth (which proves the severity of periodontal diagnosis) GTC; The age of onset is lower the more aggravating.
6. Comparing dental lesions we found that patients with type 1 diabetes had a greater number of lesions such as CI, CC and / or DC, unlike patients in the control group, which may be related to diagnosis of diabetes.
7. Considering the age of onset for sex F, we found that the minimum age at which there were cases of type 1 diabetes was two years and the maximum age was 16 years, thus associating with the average age of onset puberty sex F. Considering the age of onset for sex M, we found that the

minimum age at which there have been cases of type 1 diabetes was two years and the maximum age was 15 years, thus associating with age average onset of puberty in sex M.

8. Studying relationship between HbA1c and age groups, we found that age group from 7 - 12 years is 72% of patients with glucose imbalance after topping her age group 0-6 years, 67% of patients with glucose imbalance and then the age group between 13-18 years, 55% of patients with glucose imbalance.

9. Relationship between HbA1c and background, demonstrated that in rural areas was a significant risk factor, positive predictive for the occurrence of glycemic imbalance.

10. Relationship between HbA1c and duration of development of T1D, demonstrated that glycemic imbalance occurs in the first year of evolution, then between 2-5 of evolution tends to decrease, followed by the duration between 6-12 years development to be positive predictive value of glycemic imbalance.

11. An high positive predictive value for glycemic imbalance is a method of calculating the carbohydrates through experience, to those who use the method of calculation by weighing.

12. In terms of physical activity of patients we found a balance glycemic 51.85% of those who had physical activity consistently and only 7.14% of those who had sporadic physical activity mos.

13. Frequently of glucose determinations are frequently affect glycemic control, so that only 18.18% of patients with less than 4 measurements / day and 43.33% of those who performed more than 4 measurements / day have been in glycemic control.

14. We observed a negative correlation between HbA1c and insulin dose.