

ORAL HYGIENE LEVELS AND ORAL HEALTH STATUS IN PATIENTS WITH DIABETES – A REVIEW

Horia Lăzărescu¹, Andreea Dona Iordan-Dumitru², Andrei Kozma^{3*}, Claudiu Topoliceanu⁴,
Doriana Agop Forna⁵, Agnes K. Lackner⁶, Norina Forna⁷

¹ CS II, MD, PhD, National Institute for Recovery, Physical medicine and Balneoclimatology, Bucharest, Romania

² MD, PhD, “Titu Maiorescu” University, Faculty of Dental Medicine, Bucharest, Romania

³ CS II, PhD, MMD, MDHC – National Institute for Recovery, Physical medicine and Balneoclimatology, Bucharest; member of Academy of Romanian Scientists and of Romanian Academy of Medical Sciences

⁴ Univ.assist, PhD, Faculty of Dental Medicine, University of Medicine and Pharmacy “Grigore T.Popa”, Iasi

⁵ Lecturer, PhD, Faculty of Dental Medicine, University of Medicine and Pharmacy “Grigore T.Popa”, Iasi

⁶ MD, Medical University Vienna, University Dental Clinic, Department of Paediatric Dentistry, Austria

⁷ Prof.univ.Dr. – Dean of Faculty of Dental Medicine, University of Medicine and Pharmacy “Grigore T.Popa”, Iasi; member of Academy of Romanian Scientists and of Romanian Academy of Medical Sciences

**Corresponding author:*

Dr.Andrei Kozma CS II, MMD, PhD; e-mail: dr.ka.mailbox@gmail.com

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The authors declare no conflict of interest regarding this article.

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Abstract:

The aim of this review was to highlight the status of oral hygiene and oral health in patients from different age groups diagnosed with diabetes type 1 and type 2. Materials and method. A literature review on aspects related to oral health, oral hygiene levels in diabetic type 2 patients was conducted. Relevant clinical studies were searched through PubMed, and Scopus database. The search terms used were as follows: oral health, oral hygiene, diabetes. We included publications in English language, written in the last 20 years. Results. The oral hygiene level is poor for children, young adults and middle age patients. Diabetes patients have higher cariogenic and periodontal risk comparing with non-diabetes. Conclusions: In patients with diabetes xerostomia, dental caries, and periodontal disease are most frequently diagnosed, comparing with healthy patients. This category of patients requires intensive and constant oral hygiene training and the increase of awareness regarding the importance of oral hygiene habits in the maintaining the oral health.

Introduction.

The presence of bacterial plaque is the main factor affecting the oral health (1). Old bacterial plaque can determine the onset of dental caries, gingivitis and even periodontal disease (2,3). The constant and appropriate removal of bacterial plaque is the major factor that ensures good oral health and represents the aim of the oral hygiene techniques.

Diabetes is a metabolic and endocrine disease affecting 5 to 10% of the population (4). Patients with diabetes have constant high levels of glycemia which conducts to various systemic diseases but also to pathology in oral cavity. Diabetes mellitus is classified in type 1 and type 2 (5). Diabetes type 1 (insulin-dependent) is related to autoimmune destruction of β -pancreatic cells with a result in partial or totally insulin deficiency. Diabetes type 2 (non-insulin-dependent) is a response to genetic, environmental and lifestyle factors and is characterized by different levels of insulin resistance in peripheral tissues, reduced insulin secretion and increased glucose production.

The literature data report that bacterial plaque levels are higher and periodontal disease is most frequently diagnosed in patients with diabetes comparing to other categories of patients (6). The patients with diabetes type 1 and type 2 have a higher risk for periodontal disease due to the decrease of the defense mechanisms and the slowing down of the metabolic reactions (7), (8). Even a low volume of bacterial plaque can induce gingivitis in patients with decompensated diabetes (9). The detection of bacterial plaque is performed using plaque disclosing sponges, chewing tablets or plaque disclosing solutions. Bacterial plaque aged over 3 days is colored in blue, while young bacterial plaque is colored in red. Also, plaque disclosing tablets can color the bacterial plaque in pink. Both methods ensure increased awareness of patients regarding the role of improper teeth brushing in the accumulation of bacterial plaque. Figures 1-4 present clinical cases where plaque disclosing agents were used to demonstrate high accumulation of bacterial plaque on teeth surfaces in patients with diabetes.



Fig. 1 I.D., female, age 40. Diagnosis- diabetes type 1.
Moderate levels of bacterial plaque detected by use of plaque disclosing tablets



Fig. 2. R.M., male, age 23. Diagnosis- diabetes type 2.
Increased levels of bacterial plaque detected by use of plaque disclosing sponges



Fig. 3. D.M., male gender, age 7. Diagnosis- diabetes type 2.
Increased levels of bacterial plaque detected by use of plaque disclosing tablets



Fig. 4. B.N., female gender, age 5 ani. Diagnosis- diabetes type 2.
Increased levels of bacterial plaque detected by use of plaque disclosing sponges

Diabetes patients present higher rate of tooth loss due to various oral pathology. Oral manifestations associated to diabetes patients are as follows: dry mouth by salivary gland hypofunction, periodontal disease, root caries, oral candidiasis, mucosal ulcer, taste impairment, halitosis, burning mouth sensation, delayed wound healing (9-10). Oral manifestations in DM included periodontal disease in 34%, oral candidiasis in 24%, tooth loss in 24%, oral mucosal ulcers in 22%, taste impairment in 20%, xerostomia and salivary gland hypofunction in 14%, dental caries in 24%, and burning mouth sensation in 10% cases (11). Diabetes is characterized as a risk

factor for xerostomia. One review showed higher prevalence of xerostomia in diabetes patients (12,5%- 53,5%) comparing to non-diabetes population (0-30%) (12). Clinical and paraclinical studies reported higher flow rates in non-diabetes than in diabetes patients, while the flow rate variation among different studies is very large (13-14). Saliva flow rate is lower in the Type 2 diabetic patients, regardless of whether they were well or poorly metabolically controlled, compared with healthy individuals, while salivary glucose concentration is higher in both diabetic patient groups, i.e. well and poorly metabolically controlled, than in the control (15). Considering these data, and the role of saliva in the maintenance and the preservation of oral health, a comprehensive evaluation of the salivary function is required in this category of patients.

Regarding the relation between diabetes and cariogenic risk, the literature data are controversial. One study found that this category of patients had a higher plaque index, but similar caries levels to that of individuals without diabetes (16). Another study reported that patients with type 1 diabetes had a higher prevalence of dental caries and higher DMFT when compared with the control group (17). Patients with diabetes are associated with lower unstimulated salivary flow rate and a higher bacterial load in saliva and dental biofilm (17). This relation can be avoided with proper education and optimal nutrition and lifestyle to avoid frequent cariogenic attacks on teeth surfaces (18). The mean diet scores for diabetic and healthy subjects were 7.65 ± 3.27 and 11.9 ± 2.03 , with significant statistical differences. There was no significant difference in DMFT between the diabetics and controls (3.71 ± 2.48 vs. 4.35 ± 2.74). Regarding the oral habits, there were also no differences in frequency of tooth brushing and use of mouth washes, excepting lower frequency of using dental floss in diabetes patients (18). Significant differences were recorded between children with diabetes and healthy children regarding education, dental visits, oral hygiene, and cariogenic bacterial plaque (19).

The systemic complications (microvascular, macrovascular), higher susceptibility to infection and altered wound healing conduct to higher risk of severe periodontal disease in patients with diabetes (20, 21). The relationship between diabetes and periodontal disease two is bidirectional as the presence of one tends to promote the other and the management of either may assist treatment of the other (22). This relation is related to cyclical association as diabetes disease predisposes to oral infections, and once the oral infection is established, it exacerbates the systemic disease (22).

Proper management of salivary disorders, dental caries and periodontal disease has the potential to improve life quality for diabetes patients (23).

Conclusions: Most of the patients with diabetes type 1 and type 2 have poor oral hygiene associated with presence of bacterial plaque. The oral hygiene level is poor for high percent of children, young adults and middle age adults diagnosed with diabetes type 1 or type 2. In patients with diabetes xerostomia, dental caries, and periodontal disease are most frequently diagnosed, comparing with healthy patients. This category of patients requires intensive and constant oral hygiene training and the increase of awareness regarding the importance of oral hygiene habits in the maintaining the oral health.

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