EVALUATION OF PERIODONTAL STATUS IN A GROUP OF CHILDREN AFFECTED BY DOWN SYNDROME

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Abstract

The study aims to evaluate the level of damage of the marginal periodontium in children with Down syndrome (DS). Material and method. For de evaluation, the dental plaque index (QHI), papillary bleeding index (PBI) and clinical attachment loss (CAL) were determined, in a group of 24 subjects aged 6-16 years with DS, the values being compared to those of the control group (n = 30), aged 6-16 years, with no general diseases. Results. The values of the QHI index in the group of children with DS were 4.162 vs 3.495 in the control group; the PBI papillary bleeding index recorded mean values of 3.181 in the SD vs 1.562 group in the control group, and the loss of clinical attachment was significantly increased, with the CAL recording 1.922 in the SD group versus 0.591 in the control group. Conclusions. The results emphasize the important periodontal breakdown in children with DS.

Key words: CHILDREN, DOWN SYNDROME, PERIODONTAL DISEASE

INTRODUCTION

Down syndrome (DS) is the most common chromosomal abnormality caused by the presence of a supernumerary chromosome 21. This disease affects 1 in 700 to 800 children (1). There are three forms: free and homogeneous (result of non-disjunction), by translocation and free (in mosaic), association of physical manifestations and
intellectual disability of variable importance, depending on the particularities of the cases (IQ 40-45 for 86 % of cases) (2). The existence of the third chromosome 21 affects most tissues and organs, with suggestive craniofacial dysmorphism, various visceral malformations and psychomotor retardation in varying degrees.

Significant facial dysmorphism includes brachicephaly, hypoplasia of the middle third of the face, mandibular prognatism, thick lips, open mouth, protruding tongue, cracked / geographic tongue. Intraorally, late dental eruption, dental abnormalities (anodontia, supernumerary), shape (cone teeth), volume (microdontia), position (transpositions, rotations), structural defects (hypoplasia) are found. Also, bruxism and malocclusions are common, especially the Angle Class III abnormality.

In terms of dental caries, the authors report a decrease of incidence in children and adults with DS, explained by the obesity prevention diet (2).

From the point of view of periodontal disease, the incidence of periodontal disease in subjects with DS is very high, with a ratio of 90-100% (3); prevalence increases with age, 90% periodontal disease in children, 96% periodontal disease in adults affected by DS (2,4).

On the other hand, people with DS develop more severe forms of illness compared to the general population, bacterial gingivitis characterized by red, smooth, bleeding gums being the most common form of periodontal disease in these subjects. Patients with DS might experience severe tooth-related diseases such as early onset parodontitis (EOP), (3) and aggressive periodontitis (AP) as well, leading to early teeth loss.

**The aim of the study**

Starting from the above-mentioned considerations as well as a series of studies attesting the important periodontal affection in patients with Down syndrome, we have proposed to evaluate the degree of affection of marginal parodontium in a group of children with this disease.

**MATERIAL AND METHOD**

We have conducted a study evaluating the periodontal status in a group of children (n = 24) with DS, aged 6-16 years from the Neuropsychiatry-Genetic Disease office of “St. Maria” Ambulatory Hospital, Iaşi, and a control group children (n = 30) without systemic diseases, who addressed for the dental treatment in the Clinic of Infantile Dentistry in Iaşi.

The following clinical indexes were evaluated: the bacterial plaque index (Quigley Hein-QHI index), the papillary bleeding index (PBI), and the clinical attachment loss (CAL) index.

**RESULTS**

For the assessment of patients with Down syndrome from the point of view of clinical indexes, their values were compared with the values recorded in the control group. In the analysis of each clinical index, the statistical indicators that correctly describe the characteristics of the batch were compared, comparing with the values of the indicators corresponding to the control group.

All the values of the analyzed indexes recorded significantly higher levels in the DS group than in the control group. Thus, the QHI index recorded an average of
4.162 in the group of children with DS vs 3.495 in the control group (Figure 1).

Although the values of the plaque index (QHI) have increased, alone, microbial flora can not explain / justify the aggressiveness of periodontal disease in DS children (1,5), and a number of responsible factors increased susceptibility to oral (generally) and periodontal (especially) infections in DS subjects (1,5).

The papillary bleeding index had an average value of 3.181, two fold higher than on the control group - 1.562 (Figure 2).

Significant gingival bleeding in children with SD, explained by important bacterial plaque deposits, lack of oro-dental hygiene in these subjects, reached peak values in some cases, respectively PBI = 4 ("drop" bleeding). Also in the argumentation of this situation, other statements from the literature can be taken into account, such as: chemotaxis defect and intracellular death of neutrophils (6,7), or the compromised immune system of DS children, the basis for the development of aggressive forms of periodontal impairment similar to LAP (localized aggressive periodontitis) (8).
Figure 2. Average IBP scores in the control group and group of patients with Down syndrome

Regarding the loss of periodontal clinic attachment (CAL), significantly increased values, even 4 mm, were recorded in the DS group compared to the children of the control group in which for the majority, CAL = 0. These changes might be related to an increase in prostaglandins, especially PGE2 values in GCF (9) and other changes such as elevated activity of metalloproteinases such as MMP8 and MMP9 in polymorphonuclear (PMN) neutrophils and gingival fibroblasts (10).
Figure 3. The mean values of the clinical attachment loss in the control group and the group of patients with Down syndrome

As depicted in the above figure (Figure 3), there is an increase of 3.25 times of the average value of the CAL index in the Down syndrome group compared to the control group (1.922 vs. 0.591)

DISCUSSION

Down Syndrome - Trisomy 21 - The first genetic disorder described in 1866 by John Langdon Down, is the most common genetic anomaly (1/70 newborns). Affected individuals often develop a form of aggressive periodontal disease that affects both temporary and permanent teeth (11,12,13,14) and may lead to early expulsion of teeth, loss of alveolar bone measured on orthopantomography, was found in 69% of patients with trisomy 21 (13).

Our results are in agreement with the ones above, the evaluation of clinical indexes of periodontal status (PBI, CAL) highlighting their increases in the group of children with Down syndrome.

Periodontal changes are characterized by the formation of deep periodontal pockets, associated with increased bacterial plaque and intense gingival inflammation, in accordance with the results obtained by us. (maximum IQH = 5, ISP = 4, PAC = 4 mm).

As early as 1951, Dow (15) reported that over 90% of children with Down syndrome aged 8-12 years developed some forms of periodontal disease. Subsequent studies also reported 90-100% prevalence of periodontal disease in patients with trisomy 21 (11,12). Orner (16) reported that the periodontal index of children with Down syndrome was 4.5 times higher than in the healthy ones.

Numerous other studies have shown an increased prevalence of periodontal disease in patients with Down syndrome versus those with other deficiencies (3,12, 14, 17, 18 and others) found an increased prevalence of periodontal disease in institutionalized children with Down syndrome compared to non-institutionalized children.

Most authors reported the very early installation of periodontal degradation as well as a rapid and severe rate of destruction of the tooth support tissues (1, 19)

CONCLUSIONS

In young subjects with DS, periodontal affection is more important than dental caries. The incidence of periodontal disease in subjects with DS is very high, targeting 90-100%, with an age-related increase pattern, about 90% affected children and 96% DS adults being affected by periodontal impairment.

Periodontal degradations are established in temporary denture and continue to the permanent one, with a rapid progression, sometimes toward aggressive forms of the disease.

The results of our study are consistent with literature’s data, emphasizing the critical periodontal alteration in children with DS.
BIBLIOGRAPHY


