CORRELATIONS BETWEEN THE CLINICAL ASPECTS OF THE PERIODONTAL DISEASE AND THE HISTOLOGICAL EXAMINATION IN AUTISM SPECTRUM DISORDER (ASD) PATIENTS

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ABSTRACT

The periodontal disease constitutes a chronic destructive process, of multifactorial etiology, characterized by the intensification of the inflammatory response, leading to the destruction of the tissues supporting the teeth. This study aims to analyze several clinical parameters of the periodontal disease with the histopathological appearance seen in the ASD children. It also focuses on the relation between the prevalence of the carious lesions and this pathology.

Keywords: periodontopathy, ASD, oral hygiene, histological examination.

INTRODUCTION

The periodontal disease is triggered by several local and general factors. The onset and progress of the periodontal disease depend on the presence of pathogenic bacteria, the host's response, and the risk factors. It is undoubtedly stated that the main cause for the onset of the periodontal inflammatory conditions is dental plaque, which is “nourished” by general or local preservation factors.

Scientific evidence of the relation between the dental plaque and gingivitis was given by Löe in 1965 following several studies concerning experimental gingivitis [1]. For some autistic children, oral health habits may be a real challenge.

The increased frequency of snacks between meals is capable of changing the salivary pH level in the oral cavity. Sugar and other fermentable carbohydrates, after having been hydrolyzed by the salivary amylase, constitute a proper substrate for the harmful activity of the oral bacteria, which, in turn, increase the plaque level and decrease the salivary pH, the result being the beginning of the tooth’s demineralization.

There are numerous factors that can influence the carious process, including the shape and texture of solid or liquid foods, length of exposure, composition, eating succession and frequency, salivary flow, and the oral hygiene status.

An incorrect and incomplete brushing may influence the rate of the carious processes, but also the occurrence of gingivitis in the ASD children.

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**METHOD**

Our study included 10 children of both genders, aged between 6 to 12 years, selected among a group of 40 patients registered with the “Sf. Ioan” Children’s Clinical Emergency Hospital in Galați, diagnosed with autism spectrum disorder during January 2008 - December 2011.

The inclusion criteria for the group were the following:
- macroscopic evidence of an injury to the marginal periodontium;
- ASD diagnostic.

The rejection criteria for the study were:
- antibiotic treatment during the previous 6 months;
- the presence of an associated pathology, correlated to modifications of the marginal periodontium.

For each patient, before conducting any evaluation and sampling, we proceeded to obtain the acknowledged consent for being included in the study and drawing up a personalized chart for the evaluation of the periodontal status. The algorithm for drawing up the clinical dentistry observation chart was adopted and adapted according to the model suggested by Prof. H.T. Dumitriu [2]. The paraclinical examinations consisted in:
- evaluating the dental plaque - the plaque index;
- the oral-dental hygiene degree - the OHI;
- evaluating the gingival inflammation degree - the Silness-Löe gingival index;
- evaluating the decayed, missing, and filled index for the permanent teeth (DMF-T);
- the decayed, missing, and filled index for the temporary teeth (DMF-T).

Upon their inclusion in the group, each patient underwent a simple gingivectomy at the level of the 4.6 molar in the vestibular gum, with the circular scalpel, at 5 mm below the gingival gutter. The procedure was performed under anesthetic. Immediately after collection, the samples were fixed in a 10% neutral buffered formalin solution, for a variable amount of time, from 6 to 48 hours, depending on the size of the sample. The samples were fixed, processed by histological techniques comprising paraffin embedding, severed, H&E or TM stained, and serialized.

**RESULTS AND DISCUSSIONS**

In order to determine the dental-periodontal indices, the Ramfjord teeth were chosen (upper right first molar - 1.6; upper left central incisor - 2.1; upper left first bicusp - 2.4; lower left first molar - 3.6; lower right central incisor - 4.1; lower right first bicusp - 4.4), as the localized aggressive periodontitis conditions occur in children and teenagers, in the absence of any clinical evidence of systemic disease, being localized at the level of the 6-year old molars and the incisors [7].

The threshold value for the plaque index was 0.6, which represents the lower limit of the “well” score (0.1-0.6). The median values of the plaque index for the study group were comprised between 1.6 and 1.4.

The threshold value for the dental scale index was 0.3, which represents the median value of the “well” range (0.1 ÷ 0.6). The highest median value of the dental scale index registered for the group during the entire length of the study was 0.64, which corresponded to the lower limit of the “well” criterion.

The threshold value for the gingival index was 0.2, the “well” score being situated in the (0.1-1) range.

When determining the DMF-T index for the study group, we noticed that there were no permanent teeth extracted following the progress of certain complicated carious processes, and, as such, the index only consisted in summing up the carious lesions in order to be able to observe the correlation between diabetes mellitus and the modifications at the oral cavity level.

It has been noticed that the means of the carious lesions identified for the permanent teeth are relatively high (DMF-T 1.78). The prevalence of the carious lesions is significantly different for the two groups analyzed upon registration, therapeutic efficiency being high for the category presenting higher values for the carious lesions, meaning boys, as compared to girls.

During the histological study, we noticed the presence of the gingival inflammation, the macroscopic appearance being consistent with the microscopic one, the precarious oral hygiene increasing the severity of the gingival
Correlations between the clinical aspects of the periodontal disease and the histological examination in Autism Spectrum Disorder (ASD) patients

Inflammation [3-5]. We note the presence of a reduced lymphatic-plasmocitary infiltrate, predominantly around the blood vessels and the fibrosis bands at the level of the papillary corium (Figure 1). We note the modification of the architecture of the collagen and fibrosis fibers, which is consistent with the biochemical and quantitative determinations performed by Hilmann and Narayanan, which proves, upon the immunohistochemical (antibody) staining, that inflammation leads to a redistribution of the collagen types in the gum periodontopathic patients. While the collagen fibers types I and III are destroyed, the collagen fibers types V and VI are frequently encountered in the inflammation areas [3-7].

**Figure 1.** Appearance of the papillary corium. Disorganization of collagen fibers, fibrosis, and the presence of the plasmocitary infiltrate are noticed. HE X40 stain

In the patients we studied, we noted the presence of a moderate amount of dental plaque and scale, gingivitis induced by dental plaque being the most frequent form of periodontal condition, the clinical results being consistent with the histological examination.

**Figure 2.** The vacuolar degenerescence of the gingival epithelium. HE X40

There are degenerative modifications of the epitheliocites, involving both the nuclear component, and the cytoplasmic one, (Figure 2).

Comprehensive epidemiological studies have shown that there is a direct correlation between the social-economic status and the periodontal disease, a high index of periodontal lesions being seen in those having a low income and education level [8,9]. This aspect is consistent with our study, the ASD children failing to follow oral hygiene rules.

**CONCLUSIONS**

Periodontal disease is a complex clinical entity, the occurrence of which is supported by a series of determining and favoring factors, exhibiting a chronic evolution and necessitating a rigorous and lengthy treatment. The gingival inflammation is the result of the complex action of a great number of factors, starting with dental plaque.

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The most efficient factor in the prevention and treatment of the periodontal conditions is represented by the personal and professional surveillance of the dental plaque build-up.

Brushing your teeth twice a day and professionally teeth brushing at regular intervals, depending on the patient’s necessities, are recommended.

For some autistic children, tooth brushing may be difficult. The feeling may be uncomfortable at first, and the child might need to be desensitized. A countdown timer may sometimes be needed, for the child to know that they have finished their task.

Performing sealing procedures of the occlusal surfaces, and monitoring them until the child acknowledges the purpose of tooth brushing during the daily oral hygiene, are also helpful.
An annual dental check-up is compulsory for the ASD children. For some children, a visual program showing them what will happen during the appointment is needed. Each patient is special, therefore, it is a wise choice to talk to their family, in order to find out the peculiarities of the case (dimming the lights, decreasing the noise, presenting the medical instruments used, and approaching the patient frontally).

REFERENCES


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