

ORIGINAL RESEARCH

The role of carious lesions in the occurrence of pathological modifications in deep periodontal level – radiographic evaluation.

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Abstract

In the etiology of periodontal disease, dental caries act as a favoring factor. The purpose of our study was to evaluate the role of untreated or incorrectly treated carious lesions in the occurrence of pathological changes in the periodontal support. Material and methods: In order to evaluate the impact of the dental caries in the appearance of destructive lesions at the periodontal level, we examined 378 X-rays. The radiographies were selected based on the presence of approximal dental cavities, untreated or incorrectly treated and we appreciated the association of these factors with the presence and the level of bone resorption of the interdental septum. Results: On the 378 radiographies we examined, it was discovered the presence of 398 approximal carious lesions, of which 146 were associated with bone resorption. The examined radiographies permitted us to evaluate 1512 fillings inserted in second class cavities, of which 1103 were correctly done, and 309 were incorrect and associated with bone resorption phenomena. Incorrectly done restorations were associated with bone resorption phenomena due to the lack of contact with the adjacent tooth for 213 of these, and because of an inaccurate adaptation at the level of the gingival threshold for 96. Conclusions: The dentist has to pay a special attention to the approximal coronary restorations because these can favor the retention of bacterial plaque and, in most cases, can lead to bone loss in the alveolar ridge area.

Keywords: periodontal disease, dental caries, radiography

Introduction

In the etiology of the periodontal disease, dental caries act as a favoring factor. Due to pain in contact with food, unilateral and/or superficial chewing, self-cleaning and even artificial cleaning no longer act in the sense of removing the bacterial plaque. Therefore, the bacterial plaque accumulates in the area affected by cavities and initiates gingival inflammation.[1-5] In the case of approximal cavities, retention of food residues and bacterial plaque occur, and when the marginal ridge is interrupted a harmful impact on the interdental papilla also occurs. Proliferation of the gum may cause polypus, pediculate or sessile hyperplasia, which further accentuates the retention of debris from the cavity. This inflammation is due to fermentation phenomena or the rotten composition of food residues and it can sometimes lead to chronic gingivitis or periodontitis.[6,7] The main and circumstantial factor is the reduction of self-cleaning and even avoidance of artificial cleaning due to pain and bleeding. This alarms the patient and in order to protect the inflamed

area, thus the rules of oral hygiene are not respected.

The fillings inserted in second class cavities that were incorrectly performed, without a restoration of the contact with the neighboring tooth or by an incorrect adaptation at the level of the gingival threshold, can constitute irritating factors for the periodontal tissue.

Once the inflammatory phenomena of the periodontal layer are installed, their persistence can cause destructive phenomena to occur at the level of the deep periodontal tissue.[8]

The purpose of our study was to evaluate the role of untreated or incorrectly treated carious lesions in the occurrence of pathological changes in the periodontal support.

Material and methods

In order to evaluate the impact of the dental caries in the appearance of destructive lesions of the periodontal tissue, we examined 378 X-rays. The radiographies were selected based on the presence of approximal dental cavities,

untreated or incorrectly treated and we appreciated the association of these factors

Results

The examined radiographs showed pathological modifications of the periodontal



Figure 1. Alveolar bone resorption caused by mesial carious process on 4.8

On the 378 radiographies examined, it was discovered the presence of 398 approximal



Figure 3. Approximal carious process that accentuated bone resorption

The examined radiographs allowed us to evaluate 1512 fillings inserted in second class cavities, of which 1103 were correctly done, and 309 were incorrect and associated with bone resorption phenomena (figure 4).

Incorrectly done restorations were associated with bone resorption phenomena due to the lack of contact with the adjacent tooth in 213 of these, and because of an inaccurate adaptation at the level of the gingival threshold in 96 restorations.

Discussions

Regarding Regarding the correlation between the presence of caries or approximal

with the presence and the level of bone resorption of the interdental septum.

tissue associated with the presence of caries (figure 1) or incorrect fillings (figure 2).



Figure 2. 2.6 incorrectly adapted restoration associated with bone resorption

carious lesions, of which 146 were associated with bone resorption (figure 3).



Figure 4. Incorrectly adapted fillings in second class cavities that accentuated bone resorption

fillings with incorrect marginal adaptation and the presence of resorption of the interdental septum and the alveolar ridge, numerous studies have been conducted. These studies confirmed that in case of presence of factors that enhance plaque retention and accumulation, the alveolar bone is predisposed to resorption.

We determined that in case of carious lesions, even more in case of marginally incorrect fillings, plaque can accumulate easily, being difficult to remove, due to patient carelessness regarding interdental spaces.

In our study, of the 398 carious lesions observed, 37% were associated with the phenomenon of bone resorption.

The 146 approximal carious lesions which led to bone resorption were extended in width and depth. The persistence of microorganisms at this level, also the repeated alimentation impact and/or unilateral mastication led to the appearance of inflammatory process of the interdental papilla. This process, in time was transmitted to the periodontal structures beneath and was observed on radiographies as bone resorption phenomena.

Carious lesions which were not associated with pathological modifications of the profound periodontal tissue, were observed in an early stage of their evolution.

The observed radiographies permitted us to evaluate 1152 fillings inserted in second class cavities. 73% of these were correctly done and 27% led to bone resorption because of incorrect adaptation.

Bone resorption phenomena associated with incorrect fillings were in 67% of cases due to the lack of interdental contact with the adjacent tooth, and in 33% of cases due to incorrect adaptation of the gingival threshold.

In another similar study conducted in the Periodontology Department of the University of Budapest [9], it was analyzed whether approximal caries or fillings could contribute to periodontal attachment loss. The study was carried out on the approximal surfaces of 884 teeth, of patients between 26-32 years. For these subjects, the depth of periodontal pockets was recorded. In case of a filling which was placed on the approximal surface of teeth before the age of 26, at 32 years old the attachment loss was greater than 3 mm.

Qvist et al. [10] monitored the alveolar bone height for a period of 8 years on 3 groups of patients with fillings placed in second class cavities. 54 extended approximal fillings were compared with less extended ones. The distance between the alveolar ridge and the apical margin of the filling, also with the distance between the enamel-cement junction were annually measured for the pilot group. As a diagnostic method bite-wing radiography were used. The rate of alveolar ridge resorption was similar at both groups (less extended in the

pilot group) and got up to 0.45 mm after 4 years of surveillance.

The purpose of a similar study, conducted in the University of Plovdiv [11], was to radiologically determine the type and degree of interdental septum resorption of teeth restored on their approximal surface in different iatrogenic clinical situations. The study was conducted on 757 amalgam restorations inserted in second class cavities. The state of the interdental septum was investigated in: correct restorations, incorrect restorations with unsatisfying marginal adaptation, and restorations which lacked contact with the adjacent tooth. Horizontal resorption of the interdental septum was predominant in every study group. Restorations with unsatisfying anatomical shape, presented a higher prevalence of vertical resorption of the interdental septum, compared to the restorations with correct shape. Similarly, restorations with incorrect marginal adaptation presented a higher incidence of resorption than in the case of correct marginal adaptation. A higher degree of resorption of the interdental septum was observed in restorations with incorrect anatomical shape, with incorrect marginal adaptation and without adjacent tooth contact.

Many of the radiographies examined revealed the presence of a periodontal disease, radiologically translated by the presence of bone resorption. In these patients, generalized bone resorption, due to the periodontal disease, was visibly more pronounced at the dento-periodontal units that presented caries or incorrectly adapted fillings.

There is a correlation between the deterioration of the quality of the dental surfaces and the deterioration of the periodontal structures, due mainly to the accumulation of bacterial plaque on teeth with coronary restorations. In a study done by Carman et al. [12] on 826 patients, the integrity of the dental surfaces was examined and also the depth of the periodontal pockets was measured. The results show that the periodontal pocket depth was higher in sites with marginally incorrectly adapted fillings and in sites with recurrent caries, compared to sites with correctly done restorations. The data confirms the fact that the periodontal

conditions tend to deteriorate once the quality of the dental surfaces deteriorates.

In another study done by Sikri [13] the loss of interproximal bone matter in 100 teeth with excess fillings was compared with the loss of interproximal bone matter in 100 teeth without fillings (pilot group). In general, the bone matter loss was found in teeth with fillings that presented higher irregularities unlike the fillings with less significant irregularities.

Brunslot et al. [14] based on the research done, state that dental restorations with poor marginal adaptation represent a major dental health problem. These fillings are highly implicated in the etiology and progression of the periodontal disease, being alarmingly prevalent. In addition, gingival bleeding and increase of the loss of bone matter was found in tissues adjacent to incorrect restorations, as compared to homolog teeth. Eliminating the fillings increases the efficiency of the hygiene phase of the periodontal treatment. Many of these fillings are not easily detected, they can only be highlighted by using a subgingival exploratory, that is why most of them are not removed.

Many other studies have as their objective the examination of the effects of dental restorations, crowns and fillings, and carious lesions on the periodontal tissues. The results showed significantly greater pocket depth and bone loss around teeth with restorations and carious lesions. [15-22]

Conclusions

Periodontal disease is a multicausal condition, in which untreated or incorrectly treated carious lesions act as a favoring factor.

The presence of carious lesions can conduce to accumulation of bacterial plaque, with a decisive role in the occurrence of inflammatory phenomena in the periodontal structures.

Untreated approximal carious lesions, by their persistence and evolution, can be associated with the presence of bone resorption phenomena.

Incorrectly adapted fillings can be associated with bone resorption phenomena due to the lack of contact with the neighboring tooth and to an improper adjustment at the level of the gingival threshold.

The dentist has to pay a special attention to the approximal coronary restorations because these can favor the retention of bacterial plaque and, in most cases, can lead to bone loss in the alveolar ridge area.

In some subjects, due to a periodontal condition, generalized bone resorption was more evident in dento-periodontal units that presented carious lesions or incorrectly adapted restorations.

Conflict of interest: None to declare.

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