COMPLEX EVALUATION OF THE PERIODONTAL CONDITION IN TEETH WITH AND WITHOUT CERAMIC CROWNS

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Abstract

The scope of the study was a retrospective evaluation, involving a 1-3 year follow-up period, of the periodontal condition of teeth with fixed crowns.

The experimental group was formed of 40 patients having followed a prosthetic treatment with ceramic crowns. The complete clinical evaluations performed included analysis of the plaque index (IP), of the index of gingival bleeding (ISG), probing of the depth of the periodontal pockets (AP) and of the level of clinical attachment (AC). All these parameters were evaluated in 6 different sites of each tooth. Panoramic radiographies, on which the height of the alveolar crest was analyzed, were also taken. The mean values were obtained with the Wilcoxon statistical tests and with test t, which permitted a comparative evaluation of both test and control sites.

The teeth on which ceramic crowns had been applied had a mean value of the plaque index, IP, of 53.17% comparatively with 58.24% - the value recorded in the control teeth. The index of gingival bleeding, ISG, was 38.79% and 29.16% for the test and, respectively, control teeth. Evaluation of the depth of the periodontal pockets, AP, evidenced mean values of 2.80 and, respectively, 2.30 mm, while the mean values registered for the level of clinical attachment, AC, were of 2.05 and 2.49 mm for the test and, respectively, control teeth. The mean values for the height of the alveolar bone, evaluated radiographically, were of 13.01 for the teeth with ceramic crowns, and of 13.96 mm, respectively, for the control teeth.

The conclusion of the study, based on the results obtained, is that teeth with ceramic crowns may frequently show signs of inflammation, yet not necessarily accompanied by irreversible destruction of the periodontal tissue.

Keywords: ceramic crowns, sound teeth, periodontal evaluation

INTRODUCTION

Most of the studies dedicated to such topics focus on the various aspects of the relation between dental materials, surface characteristics of the covering crowns, marginal adaptation, providing useful orientations for the therapeutic prosthetic scheme to be applied. They also suggest that the dental crowns may frequently create problems for the periodontium. [1,2]

Unfortunately, recent investigations, evaluating the relation between dental prostheses and the periodontium, have been mainly focused on the presence of inflammation and not on the periodontal collapse. However, the authors are convinced that the therapeutical success of a dental prosthesis may be obtained not only through resitutio ad integrum but also through its long application without causing periodontal problems. [3,4]

Accordingly, evaluation of the periodontium surrounding the prosthetic work is especially important in dental medicine, mainly for the identification of the risk factors for adverse events. Radiographic analysis may disclose any sign of affection of the alveolar bone. [2,4]

SCOPE OF THE STUDY

The scope of the study was a retrospective evaluation, involving a 1-3 year follow-up period, of the periodontal condition of the teeth with fixed crowns.

MATERIALS AND METHOD

A group of 36 patients, 11 males (30.55%) and 25 women (69.45%), with ages between 30 and 55 years, has been selected for the study. Each subject should have one tooth with a metalo-ceramic crown applied at least 2 years ago (test tooth), as well as a contra-lateral healthy tooth (control). Patients with any other dental prostheses, who needed treatment with antibiotics or suffering from systemic diseases that might
affect the periodontium, were not accepted in the study.

The marginal (supragingival, juxtagingival or subgingival) adaptations of the crowns were clinically and periodontally evaluated in 6 tooth sites.

Radiographic evaluation was made on periapical radiographies measuring the distance between the apical peak and that of the bone alveolar crest, both mesially and distally.

The values expressing probing of the depth of the periodontal pockets (AP) and the level of clinical attachment (AC), and also the height of the alveolar bone, evidenced radiographically, were calculated and compared both for teeth with ceramic crowns and for the control teeth, by means of test t. The Spearman correlation coefficients were calculated for the inadequate crowns, placed subgingivally, on the basis of the clinical and radiological data obtained.

RESULTS

Most of the sites evaluated at the level of the ceramic crowns demonstrated their suitable marginal adaptation (78.3%). As to the topography of marginal adaptation, 37.1% of the crowns were placed either supragingivally or at the gingival margin, and 62.9% - subgingivally.

The clinical, radiographic and microbiological parameters of the examined teeth are listed in table 1. 53.17% of the teeth with ceramic crowns showed a mean value of the visible bacterial plaque lower than that of the control teeth (58.24%). The index of gingival bleeding was higher (38.79%) in the teeth with ceramic crowns, comparatively with the control ones (29.16%). The recorded difference was statistically significant. (tables 1, 2)

<table>
<thead>
<tr>
<th>Marginal adaptation</th>
<th>Number of evaluated sites</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Correctly adapted margins</td>
<td>188</td>
<td>78.3</td>
</tr>
<tr>
<td>Incorrectly adapted margins</td>
<td>52</td>
<td>21.7</td>
</tr>
<tr>
<td>Total</td>
<td>240</td>
<td>100.0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Localization of the coronary margins</th>
<th>Number of evaluated sites</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supra- or juxtagingival localization</td>
<td>89</td>
<td>37.1</td>
</tr>
<tr>
<td>Subgingival localization</td>
<td>151</td>
<td>62.9</td>
</tr>
<tr>
<td>Total</td>
<td>240</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Table 2. Mean values (± standard deviation) of the clinical and radiological parameters
(n = 240 sites, 36 patients)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Teeth with ceramic crowns</th>
<th>Control teeth</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plaque index, IP (%)</td>
<td>53.17 (66.10)</td>
<td>58.24 (50.10)</td>
<td>0.000 a</td>
</tr>
<tr>
<td>Index of gingival bleeding, ISG (%)</td>
<td>38.79 (47.24)</td>
<td>29.16 (44.09)</td>
<td>0.035 a</td>
</tr>
<tr>
<td>Depth of the periodontal pockets, AP (mm)</td>
<td>2.80 (0.99)</td>
<td>2.30 (0.86)</td>
<td>0.008 b</td>
</tr>
<tr>
<td>Level of clinical attachment, AC (mm)</td>
<td>2.05 (1.36)</td>
<td>2.49 (2.00)</td>
<td>0.30 – ns b</td>
</tr>
<tr>
<td>Height of the radiographically evaluated alveolar bone (mm)</td>
<td>13.01 (2.63)</td>
<td>13.96 (2.38)</td>
<td>0.000 b</td>
</tr>
</tbody>
</table>
Discussion
The present study evaluated the periodontal parameters of the teeth with ceramic crowns, comparatively with those of the control ones, having suffered no prosthetic treatment.

Evaluation of the oral hygiene condition showed that the supragingival plaque was present in higher ratios in the control teeth – comparatively with those with ceramic crowns, which is quite surprisingly, being nevertheless explained by the fact that the surface of the ceramic crown is much smoother than that of the natural teeth, thus preventing plaque adhesion on it.

Reversely, marginal inflammation evaluated by the IP index – the plaque index – and by the ISG index – the index of gingival bleeding, was much more pronounced in the teeth with ceramic crowns, which urged us to better explain to our patients the importance of oral hygiene at home. Nevertheless, mention should be made of the fact that, in the present study, 62.90% of the crowns had been placed subgingivally, which may largely explain the more frequent gingival bleeding in teeth with ceramic crowns. [1,5,6]

As to the depth of the periodontal pockets, AP (mm) and level of clinical attachment, AC (mm), higher values have been recorded in the teeth with ceramic crowns, comparatively with the control ones (table 2, figures 1,2).

More than that, even if with small differences, a constantly higher value of bone loss was observed radiographically in the teeth with ceramic crowns.

CONCLUSIONS
The conclusions of the present investigation represent a challenge for both periodontology and prosthetics. If, on one side, differences in the extent of periodontal affection have been noticed, on the other, more extended inflammation processes were seen, especially in the subgingivally-placed crowns.

Accordingly, considering the here obtained results, one may assert that the teeth with ceramic crowns may display more numerous inflammation signs, even if no association with periodontal destruction had been established.
References


