A CLINICAL STUDY ON THE PERIODONTAL-IMPLANTO-PROSTHETIC REHABILITATION IN PATIENTS WITH PERIODONTAL DISEASES

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Abstract

Scope of the study: A comparative analysis on the reliability of the methods of oral rehabilitation of partial edentation through fixed prostheses on dental support vs. prostheses on implants in patients with periodontal diseases.

Materials and method: The experimental group was formed of 56 patients (25 men and 31 women), with ages between 23 and 68 years, and different classes of partial edentation in patients with a periodontopathic field. Mention should be made of the fact that, in the case of terminal edentations, a corresponding number of implants has been used, so that to reduce, as much as possible, the number of intermediates involved in the bridge bodies entering the structure of the prosthetic works with dental-implantary support.

Results: The survival ratio for the implants substituting the periodontally-induced dental losses was of 90.5%, while that of the implants for the replacement of the teeth lost from other causes (caries, fractures, traumas) was of 96.5%.

Conclusions: The present study supports the assertion that, if the specific conditions of the clinical case under discussion permit it, fixed prosthesis on a mixed support, together with some natural odonto-periodontal units, the contribution of fractured implants in the case of implantary support vs. implanto-dental mixed support, the part played by the biological complications occurring at implantary (peri-implantitis) and odontal (periodontal sufferings, endodontic diseases) levels, the contribution of the complications of technical nature (porcelain fracture, fracture of the prosthetic works, demecementation of the prosthetic works), should be mentioned [2,3].

As part of the oral rehabilitation of partial edentation, the implants may be used for the realization of prosthetic suprastuctures with exclusively implantary or with mixed supports. However, as some specialists consider that the biologically-integrated oral implants suffer some stiffening at the level of bone structures and, consequently, they have no resilience, the rigid-type connexions between implants and the natural teeth should be avoided, if considering the risk of a mechanical overstressing of implants. Consequently, to compensate for this difference of mobility, incorporation, at the level of oral implants, of some non-rigid suprastructures, such as the silicone intramobile element from the IMZ implants produced by the Friadent Company, has been recommended. Up to now, no study definitely supporting this principle has been elaborated [4-6].

INTRODUCTION

In the last two decades, treatment of the edentulous condition through prosthetic structures with implantary or mixed support became a largely applied clinical method.

Nowadays, the opportunity of saving some odontal units or of directly deciding on their extraction and substitution with dental implants is intensely under debate [1]. Some recent studies aimed at analyzing the following parameters: the extent of bone resorption in the case of implants assuring a mixed support, together with some natural odonto-periodontal units, the contribution of fractured implants in the case of implantary support vs. implanto-dental mixed support, the part played by the biological complications occurring at implantary (peri-implantitis) and odontal (periodontal sufferings, endodontic diseases) levels, the contribution of the complications of technical nature (porcelain fracture, fracture of the prosthetic works, demecementation of the prosthetic works), should be mentioned [2,3].
SCOPE OF THE STUDY

A comparative analysis was devoted to the reliability of the methods of oral rehabilitation of partial unidental edentation through conjunct prosthesizing on a dental support vs. prosthesizing on an unidental support, as well to the oral rehabilitation of Kennedy class I and II edentations through conjunct prosthetic means with mixed dental-implantary support vs. partially mobile prostheses in implanted patients with and without periodontal diseases.

MATERIALS AND METHOD

The experimental group was formed of 56 patients (25 men and 31 women), with ages between 23 and 68 years, and different classes of partial edentation, to whom prosthetic fixed prostheses on dental support, covering crowns fixed on unidental implants, prosthetic fixed prostheses on mixed support: implants and teeth, partially mobile prostheses, have been applied.

The patients, selected for clinical and radiographic evaluation, had been treated as to their periodontal problems prior to the installations of implants and incorporation of suprastructures. All implants employed were Nobel Biocare and Alpha Bio Dental Implant System, being inserted according to the instructions of the manufacturer. The suprastructures were composed of singular crowns or partially fixed prostheses, applied 4-6 months after the intervention.

Mention should be made of the fact that, in the present research, a corresponding number of implants has been used for the terminal edentations, so that to restrict as much as possible the number of intermediates present in the bridge bodies entering the structure of the gnathoprosthetic devices with dental-implantary support.

RESULTS

Immediately after the initial periodontal therapy, the patients were subjected to a supporting periodontal therapy, at intervals ranging between 3 and 6 months. During each re-examination, performed along the 5 years of the investigation, all biological complications (peri-implantites) were registered and treated according to the protocol of implant’s maintainance. (Lang, 2000) [3]

Clinical examination

The same clinical and radiographic evaluations, performed both after 1 and 5 years of examinations, included the following clinical parameters: probing depth, level of attachment – for estimating the bone loss, bleeding at probing.

All measurements were made in four zones of each implant, by means of a periodontal probe. The distances were measured up to the closest millimeter.

Radiographic examination

The radiographies were obtained at 1 up to 5 years of functioning. The changes observed in bone height during the observation period were also recorded.

In the present study, the success criteria – established according to Karoussis et al. (2003) [4] – included: the absence of mobility, absence of prolonged discomfort (pain, sensation of foreign body or disestesia), absence of pockets > 5 mm, absence of pockets = 5 mm and bleeding on probing +, absence of continuous radio-transparency around the implant. The first year after the implant, the annual vertical bone loss should not exceed 0.2 mm. The implant is considered as having failed (implant with complications), if the annual, mesial or distal bone loss exceeds 0.2 mm, or if probing depth is higher or equal to 5 mm, and bleeding on probing is positive.

DISCUSSION

An implant may be considered successful when it meets both criteria, namely the clinical and the radiographic ones.

Worth mentioning is that evaluation of the success ratio included not only survival of the implant, but of all those inserted from the beginning of the observation, considered as failures.
Obviously, exclusion of the failed implants would increase the success level, but it would lead to false interpretations of the real situation.

The implant was viewed as a failure if: peri-implant radiotransparency could be detected in the intra-oral radiographies, the intra-oral implants shown the slightest sign of mobility – according to the Periotest values (Siemens, A.G, Bensheim, Germany), the patient showed subjective signs of pain or infection, which required removal of the implant. The edentation type was classified according to the presence and location of the natural teeth in the oral cavity, in relation with the place of implant’s positioning: total edentation, teeth present only in the antagonistic maxillary, teeth present in the same maxillary with the implant, but not in its vicinity, and with the teeth neighbouring the implant.

Utilization of antibiotics prior to or after the intervention was defined as present or absent. The general health condition and the medical history of the patient were registered by means of a questionnaire.

More than that, the medical status was evaluated by means of hospitalization records; in their absence, data were obtained from the doctor.

The reason of the high susceptibility to the biological complications possibly occurring around the implants, in patients affected with periodontal diseases, comparatively with those without such a medical history, may be discussed in terms of the accumulation of bacterial plaque in partially-edentulous teeth or of the host response to the bacterial attack. Both aspects may vary when the comparison is made with patients having lost their teeth because of some chronic or aggressive causes of periodontitis [5-7].

Loss of implants may be the result of multiple episodes of peri-implantary infections, which explains why the incidence of peri-implantites on subjects with antecedents of periodontitis may be much higher than in the others [7].

In spite of this maintenance program, the group of patients with periodontal history, examined at intervals of 3-5 months, suffered much many episodes of peri-implantitis, comparatively with the subjects with no antecedents of this type, controlled at 4-8 month intervals.

The survival ratio for the implants substituting the dental losses with periodontal causes was of 90.5%, while the survival ratio of those replacing the teeth lost from other causes (caries, fractures, traumatisms) was of 96.5%. (Table 1)

<table>
<thead>
<tr>
<th>Group</th>
<th>Survival ratio (%)</th>
<th>Failure (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A – patients with periodontal antecedents</td>
<td>90.5</td>
<td>9.5</td>
</tr>
<tr>
<td>B – patients without periodontal antecedents</td>
<td>96.5</td>
<td>3.5</td>
</tr>
</tbody>
</table>

As one may observe, the failure ratio in group A was of 9.5% and, in group B, of 3.5%.

Statistically, this difference is not very important, as the difference between the survival norms is evident, especially after 6 years of implants’ utilization.

The time period between implant’s insertion and the manifestation of a biological complication, or up to the end of the evaluation period (5 years), was established for all implants.

71.4% of the implants belonging to the patients from group A showed no biological complications (peri-implantites), while 94.2% of the implants from group B showed no biological complication along the evaluation period of 5 years.

Cumulative incidence of the peri-implantites over the 5 year period was of 28.6% for the patients in group A, and of 5.8%, respectively, for those from group B (Table 2).

<table>
<thead>
<tr>
<th>Group</th>
<th>Nr. of implants without complications</th>
<th>Incidence of complications</th>
</tr>
</thead>
<tbody>
<tr>
<td>A – patients with periodontal antecedents</td>
<td>71.4</td>
<td>28.6</td>
</tr>
<tr>
<td>B – patients without periodontal antecedents</td>
<td>94.2</td>
<td>5.8</td>
</tr>
</tbody>
</table>

The success ratio of the implants applied to the two groups of patients is listed in Table 3.
Table 3 – Success ratio of implants

<table>
<thead>
<tr>
<th>Group</th>
<th>Nr. of implants</th>
<th>Success ratio</th>
<th>Clinical success</th>
</tr>
</thead>
<tbody>
<tr>
<td>A – patients with periodontal antecedents</td>
<td>21</td>
<td>11 (52.4%)</td>
<td>15 (71.4%)</td>
</tr>
<tr>
<td>B – patients without periodontal antecedents</td>
<td>91</td>
<td>72 (79.1%)</td>
<td>86 (94.5%)</td>
</tr>
</tbody>
</table>

Based on the set of criteria establishing the success (probing depth = 5 mm and absence of bleeding on probing, as well as a bone loss < 0.2 mm yearly), the success ratio was considered of 52.4% for the implants replacing the teeth lost through chronic periodontitis, and of 79.1%, respectively, for the implants substituting the teeth lost from other reasons. According exclusively to the clinical parameters of success (probing depth > 5mm and absence of bleeding on probing), the ratio recorded was of 71.4% and, respectively, 94.5% for groups A and B.

The type of edentation has significantly affected the first failures, when the Fisher test was applied. A higher ratio of failure was observed in the implants with natural teeth in their vicinity (values p: Fisher 5 0.004, GEE 5 NA).

The study revealed the fact that, in the case of gnathoprosthesis-prosthetic devices on odontal support, the most frequent complications include the occurrence of caries in the abutment teeth (11%), as also confirmed by literature data. In most cases, they appear on teeth having required previous treatments of the odontal coronary lesions.

The marginal periodontium was seen as affected in 4.1% of cases (3.3% chronic gingivitis, 0.8% marginal periodontitis).

As to the prosthetic reconstructions applied on an unidental implant, peri-implantitis phenomena have been registered in 5.7% of cases (peri-implantitis involving the existence of a peri-implantary pocket larger than 5 mm, associated with bleeding on probing and radiologically objectivated alveolar resorption), bone resorption generated by mechanical overstress in 2.8% of cases, while the phenomena of implantary mobility were registered in 2.5% of cases.

No implant fracture occurred, loosening of the screw fixing the prosthetic dies being observed in 0.5% of the patients of the experimental group. Fracture of the veneering material appeared in 2.3% of cases, while decementation of the prosthetic works – in 4% of the patients. No fracture of the prosthetic work was mentioned.

A comparison between the two treatment methods permits the conclusion that each of them is a reliable one, on condition of a most correct application of one or another. Obviously, the patients with sound teeth in the vicinity of the edentulous gap and financially able to follow an implantary treatment, will undoubtedly do this.

If the conditions for the realization of such works are met, with no morphological and functional compromise, this type of treatment is highly recommended.

The study demonstrated the absence of significant differences between the two therapeutical variants, as to the complications that may occur.

The results obtained show that utilization of the implanto-dental support for fixed prosthetic suprastructures along a 3 year interval affects the marginal periodontium in 3.5% of cases, most of them being represented by teeth having already antecedents of the disease, even if it had been stabilized prior to the implantary and, respectively, prosthetic treatment [8,9].

As to the implants, 5.7% of them showed peri-implantitis phenomena, 5% of the patients had periapical lesions, 2% of them showed implantary mobility. No case of fracture of the dental implants was recorded. Peri-implantary bone resorption occurred in 6% of cases.

Application of the partially amovible/composite prosthesis, with muco-osseous and dental-periodontal support, causes periodontal problems in 20% of the patients, 5% of them showing periapical lesions, 2% of them showed implantary mobility. No case of fracture of the dental implants was recorded. Peri-implantary bone resorption occurred in 6% of cases.

Resorption of the alveolar ridge occurred in 45% of cases, which is a significantly higher ratio than for the prosthetic works involving dental-implantary support.
The present study supports the assertion that, if the specific conditions of the clinical case under discussion permits it, fixed prosthesing on a mixed implanto-dental support is more indicated, if considering that this type of prosthesis causes less negative modifications of the prosthetic field, comparatively with the partially-mobile one.

CONCLUSIONS

1. The comparative study on the reliability of the classical methods of oral rehabilitation of unidental edentation vs. the utilization of the unidental implant evidences the higher reliability of the latter one, on condition of a strict observance of the implant indications.

2. The study, developed along 5 years, demonstrated that oral implants may be inserted and maintained equally to patients with or without periodontal antecedents. Anyway, the patients who suffered from periodontitis showed a lower level of implant survival (90.5% vs. 96.5%), as well as more complications (28.6% vs. 5.8%) and a low success ratio (71.4% vs. 94.5%), comparatively with the patients with edentulous problems caused by other reasons and not by periodontitis.

References


