A CLINICAL STUDY ON THE PERIODONTAL STATUS OF PATIENTS WITH IMMOBILIZATION DEVICES

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Abstract

Clinical management of mobile teeth is no longer a difficult task. Dental mobility, which occurs as a result of periodontal disease progression, may be now treated by means of various therapeutic procedures, temporary, semi-permanent, and permanent immobilization being capable of providing good teeth prognosis and securing stability to the periodontal treatment.

The aim of the present study is to establish the modification of the periodontal parameters in a group of persons suffering from periodontal diseases, in whom management of the mobile teeth was meant at restoring the periodontal function by means of periodontal stability.

The study was carried out on a group of 135 patients with periodontal disease, divided into two groups: a control group and a test group, on which endodontic therapy was applied with immobilization devices.

The data analyzed in the Results and Discussion section show that the pathological dental mobility accompanying periodontal destruction gradually affects the interocclusal relations, which leads to disfunctions of the dentomaxillary apparatus.

Consequently, deciding on a treatment with immobilization devices in patients with periodontal disease depends on the peculiarities of the clinical picture, on the extent of the deep periodontium injury, on interocclusal relations, as well as on the possibilities of creating a very good occlusal equilibrium.

Keywords: periodontal immobilization, mobility degree, immobilization devices, periodontal status

Introduction

Teeth mobilization appears as an adaptation process of the paradontium to occlusal forces, which should not be necessarily viewed as being pathological. (1)

In the absence of inflammation, the mobile teeth with healthy periodontal tissues may be preserved.

X-ray evidence of an enlarged space of the periodontal ligament, coupled with the clinical diagnosis of the teeth with increased mobility, may only appear as a manifestation of adaptive modifications to achieve increased functional requirements (2).

Aim of the study

The general objective of the present study is to create the conditions necessary for maintaining tooth mobility within physiological limits, during restoration of the necessary functions, and patient's comfort, as well.

The main target of immobilization is to reduce the tridimensional displacement of teeth, in the absence of a corresponding periodontal support.

Such an objective may be attained by an adequate arrangement of an immobilization device on the whole arch while, for a successful immobilization, the center of tooth rotation should be localized in the remaining supporting bone. In such a case, the affected teeth will resist tooth movement. Otherwise, the prognosis for any immobilization device will be an unfavourable one, if the occlusal or mastication forces will be higher than the resistance of the tooth inserted in the immobilization device (3,4)

Materials and method

The group under study, including 143 patients with ages between 42-65 years, affected by chronic periodontitis, was divided into two groups:

- a control group consisting of 67 patients: 27 men and 40 women, with periodontal disease and conservative periodontal treatment,
- a test group consisting of 76 patients: 47 women and 29 men, with periodontal
disease, to whom various types of immobilization devices were inserted.

All patients were subjected to etiopropic therapy, to the Wilcoxon test (5-6) and, according to the clinical condition, temporary, semi-permanent and permanent immobilization devices were inserted.

![Fig. 1 - Periodontal immobilization with fixed prosthesis](image1)

**Fig. 1** - Periodontal immobilization with fixed prosthesis

Recordings were made both prior to the treatment and after completing the etiological therapy and insertion of the immobilization devices.

### Results and discussion

**Table I** Characteristics of the group of patients

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Control (N=65)</th>
<th>Study (N=67)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average age</td>
<td>51</td>
<td>53</td>
</tr>
<tr>
<td>Men</td>
<td>29</td>
<td>27</td>
</tr>
<tr>
<td>Women</td>
<td>47</td>
<td>40</td>
</tr>
<tr>
<td>Teeth evaluated per patient (average value)</td>
<td>27</td>
<td>28</td>
</tr>
</tbody>
</table>

**Table II** - Analysis of clinical presentation of periodontal disease

<table>
<thead>
<tr>
<th>Symptoms of the periodontal disease</th>
<th>% of the number of patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spontaneous bleeding</td>
<td>10%</td>
</tr>
<tr>
<td>Inflammation</td>
<td>99%</td>
</tr>
<tr>
<td>Gingival recession</td>
<td>48%</td>
</tr>
<tr>
<td>Gingival overgrowths</td>
<td>2%</td>
</tr>
<tr>
<td>Dental mobility</td>
<td>59%</td>
</tr>
<tr>
<td>False/seal pockets</td>
<td>42%</td>
</tr>
</tbody>
</table>

The periodontal ligament may be either regenerated or ankylosed may occur, with or without slight inflammation. Moderate or severe inflammation may persist, preventing tissue restoration, which means that dental immobilization failed and can represent an exacerbating factor of disease progression.

**Table III** - Reduction in the depth of periodontal pockets

<table>
<thead>
<tr>
<th>t test</th>
<th>Level of clinical attachment (mm) – average values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group</td>
<td>Study</td>
</tr>
<tr>
<td>Pre-treatment</td>
<td>5.79</td>
</tr>
<tr>
<td>Post-treatment</td>
<td>3.59</td>
</tr>
<tr>
<td><strong>P</strong></td>
<td>0.00001</td>
</tr>
<tr>
<td>Difference</td>
<td>2.19</td>
</tr>
</tbody>
</table>

A significant difference should be observed between the 2 groups (p=0.00001). Analysis of
covariation, employing the initial values of pocket depth, as well as the covariant, shows that the significant final difference between the two groups does not depend on the initial depth of the pocket.

Increase in the clinical attachment is significant, both in the control and in the test group (P=0.00001), the values recorded being of 1.15 mm in the test group, in comparison with 1.92 mm in the control group.

Table IV- Plaque index (average values, mm)

<table>
<thead>
<tr>
<th>Wilcoxon test</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Group</td>
<td>Test</td>
<td>Control</td>
</tr>
<tr>
<td>Pre-treatment</td>
<td>1.87</td>
<td>1.7</td>
</tr>
<tr>
<td>Post-treatment</td>
<td>0.85</td>
<td>1.5</td>
</tr>
<tr>
<td>P</td>
<td>0.0001</td>
<td>0.0001</td>
</tr>
<tr>
<td>Difference</td>
<td>1.17</td>
<td>0.65</td>
</tr>
</tbody>
</table>

The plaque index was significantly lower in both groups, comparatively with the initial values (P=0.00001), as well as between them.

It was noticed that, in the test group, the longer the span of time from the occurrence of dental mobility or of the gap in the dental arch, the more evident the modifications in the dental arches were and, consequently, the occlusal disorders.

Disintegration of the inter-dental and inter-occlusal connections induced by dental mobility and interruption of dental arches, under the influence of the functional factor, accelerates occlusal disequilibrium, thus aggravating the clinical picture of occlusal disorders. In their turn, they involve the other structures of the dento-maxillary apparatus in the pathological process, which causes global disfunction.

In clinical cases of periodontal disease and partial edentations, dental migrations, destruction of the occlusal relief and occlusal disharmony resulted.

In their turn, such morphological disorders contribute to changing the distribution direction of the functional forces, which has a negative impact on the periodontium and on the statistics of the teeth involved in the process (6,7).

Calculations on teeth biomechanical stability showed that, when a force is applied, the resistance center occurs in the middle of the monoradicilar teeth root, as well as in the area of molar bifurcation. If the resistance center does not change its position when applying the force, then the rotation center takes a position according to the duration and intensity of the force.

The clinical picture of such occlusal disharmonies will show abrasive sides, recessions, thickening of the gingival edge and/or pathological teeth mobility.

Fig. 4 - Radiographic aspects of periodontal pathology, with partial edentations and dental migrations, destruction of the occlusal condition and occlusal disarray

Fig. 5 - Clinical picture of occlusal disharmonies - abrasive sides, recessions, thickening of the gingival edge and/or pathological teeth mobility
In this respect, mention should be made of the fact that, in the periodontal regions in which the dento-alveolar ligaments are subjected to traction forces, apposition of the bone tissue occurs while, in the regions in which pressures are applied, resorption occurs.

The conclusion to be drawn is that any treatment with fixed prostheses should meet the principles of occlusal equilibrium and eliminate occlusal obstacles, as basic criteria for a corresponding functionality (11). The concept of occlusal stability, creating the conditions to protect the equilibrium of the components of the dento-maxillary apparatus assumes a harmonious correlation among the dental, muscular and ATM systems.

A special part in achieving such an equilibrium among the components of the apparatus, taken as a whole, is played by the biomechanical forces, acting firstly upon the teeth, periodontium, maxillary bones and ATM(8). Radiological results put into evidence the presence of functional teeth over-stress through enlargement of the periodontal space, of signs indicating resorption of the periodontal bone tissue, as well as of a different leaning degree towards the mesial zone of the teeth situated in the vicinity of the mandibular gap.

A correct estimation of the clinical configuration of the disease, of its evolution, evident in the affected teeth, should result from a thorough clinical examination, supported by para-clinical investigations.

The occurrence of generalized and progressive bone atrophy, of dental migrations generating occlusal trauma requires urgent application of a temporary immobilization therapy, meant at balancing occlusion and at stopping dental shiftings.

Temporary immobilization should be maintained during the whole period of paraclinical investigations and also during the etiological therapy.

A corrective therapy makes use of long-term immobilization devices that should be applied during the whole duration of the treatments, for maintaining the positive results obtained.

Temporary immobilization provides – even for limited time periods – the favourable conditions for periodontal healing.

In extreme cases of teeth with maximum mobility, to postpone extraction, immobilization by simple extra-cranial means, which provides limited functionality in time, is sometimes
recommended. Immobilization may be also applied prior to other therapeutic procedures, or following a drug or surgical treatment.

In spite of the outstanding success recorded in recent decades in modern dentistry – to mention here only the new materials, instruments, devices and technologies of direct and indirect restoration – present-day patients are interested not only in the restoration of their teeth and of all their functions, but also in a very good aesthetic aspect – which depends, to a considerable extent, on the utilization of high quality ceramics and composites. In occlusal restorations, a faithful reproduction of the occlusal relief of the injured or absent teeth is of special importance.

Conclusions

- The results of the radiological examinations confirmed the presence of functional over-stress on the teeth under analysis, manifested by enlargement of the periodontal space and by the occurrence of signs of resorption in the periodontal bone tissue, together with a varied leaning degree towards the mesial region of the teeth situated in the vicinity of the mandibular gaps.
- A comparative analysis of the periodontal status shows a significant difference between the two groups (p= 0.00001). Analysis of covariance, employing the initial values of the pocket depth as a covariant, illustrates that the final, significant difference between the two groups does not depend on the initial depth of the pocket.
- The clinical attachment gain is significant, both in the control and in the test group (P=0.00001), values of 1.15 mm being recorded in the test group, versus 1.92 mm in the control group.
- The plaque index was significantly reduced in both groups, compared with the initial values (P=0.00001), as well as between the two groups.
- The clinical manifestation observed in the region of the marginal periodontium occurred as gingivitae, gingival recessions of various degrees, periodontal pockets while in 68% of the patients – dental migrations of various grades were also noticed, in both sagittal and vertical plane.
- In the absence of dental immobilization, some teeth from the arches are over-used through occlusal trauma, while others become non-functional.
- An insufficient stimulation will finally reduce the thickness of the periodontal ligament, as well as the dental-alveolar space, fibre atrophy, osteoporosis of the alveolar bone being manifested by a higher radio-transparency, as a result of bone demineralization.
- Recovery of a non-functional tooth by means of a prosthesis, which also has immobilization effects, may sometimes cause a secondary occlusal trauma, if the gnatho-prothetic apparatus was not designed according to scientific principles.
- In the present study, common methods of investigation and treatment procedures were used, to be of help in dentistry practice.

References

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