A CLINICAL EVALUATION OF FIXED DENTAL PROTHESES WITHOUT REGULAR MAINTENANCE
Gabriela Ifteni¹, Alina Apostu¹, Nicoleta Ioanid, Cristina Cotea², Mona Brînză², Diana Niţescu¹, Laura Checheriţă¹, Oana Țânculescu-Doloca¹

1. Department of Odontology – Periodontology, Fixed Prostheses, Faculty of Dental Medicine, Gr. T. Popa, University of Medicine and Pharmacy, Iaşi, Romania.
2. Private practice Dentalia Medical, Iaşi, Romania
*Corresponding author: Laura Checheriţă, Assistant prof.
Gr. T. Popa. University of Medicine and Pharmacy, Iaşi, Romania
Email: checherita.laura@gmail.com

ABSTRACT. The purpose of the study was to evaluate the 5-year survival rate and the eventual reason of failure of fixed dental prostheses (FDPs) without long-term maintenance after intraoral insertion. 427 patients were subjected to our study. They did not receive any maintenance after the insertion of FDPs between 2005 and 2008. The patients were treated at the Prosthodontics Clinic, Dental School Grigore T. Popa University from Iasi, Romania. The subjects were contacted by letter or telephone to be asked for their participation. There were investigated parameters concerning oral hygiene status; abutment teeth; FDPs success / survival / complication and failure rate. The survival rate of the FDPs was 58% and the failure rate was 42% with a functional period of 5.4 years. The FDPs required retreatment at the time of examination, indicating 85% of the complication rate and 14.5% of the success rate. From the 3161 analyzed abutment teeth, 64 were extracted and from this resulted a 10% failure rate. The most common reasons for the complications were periodontal disease, loss of retention, endodontic treatments, decays, poor marginal adaptation and fracture of FPDs. The abutment teeth and fixed dental prostheses without clinical maintenance had many periodontal problems due to the dental plaque. The fatigue-mechanism could be advocated as the main factor for the failure of all-ceramic crowns.
Key words: dental prosthesis, hygiene status, survival FDP-s.

Microprotheses with their various forms of practical performance are a therapeutic means commonly used in the current dental practice. Even with the high frequency of the use of this therapeutic means, sometimes deficiencies occur over time, deficiencies which may compromise the entire prosthetic treatment and even more frequent when the patient are not accurately monitored. Unfortunately, many patient do not understand that they should come for the preventive examination, lose touch with their attending physician or come too late when tooth losses are inevitable. In this study, we aim at, based on the analysis of the significant study lot, formed of patients who have received dental treatment in our Clinic, assessing the survival rate of prosthetic treatments, which were not included in any form of follow-up. The parameters regarding the hygiene status, the complications occurred to the abutment teeth or at the level of the surrounding tissue have been observed.

When taking into consideration the performance of crowns or bridges, one must keep sight of the reconstruction of the entire masticatory system. Therefore, the diagnosis, the prognosis and the treatment plan may be accurately achieved and formulated just by considering the system as a whole - the residual teeth on the arch, the periodontium, the ATMs and the neuromuscular system. Each restoration has occlusal, periodontal, endodontic and aesthetic aspects, although the periodontal and occlusal grounds are the most important for the long-term preservation and
endurance of the tooth and the health of the masticatory system, the aesthetic ones are also important, especially for frontal restorations.

decays and the periodontal disease are the most frequent disorders of the oral cavity and their effects are well-known. The decay may affect the teeth until complete destruction and this is possible in youngsters prior to the completion of the root formation. It is believed that with a diet of low carbohydrates and with fluoridated water the incidence of decays may decrease, but these efforts shall not remove the main cause for tooth loss, namely the periodontal disease.

Epidemiological studies have proven that man is subjected to the attack of the periodontal disease. Starting in 1966, the WHO has reported that in the vast majority of the countries, approximately half of the children and almost the entire adult population suffered from a certain level of periodontal disease. These studies prove the quantity of the destruction of natural dentition due to the periodontal disease and this is not yet fully understood by the majority of the population, who considers that the most devastating for oral health are the decays.

It is obvious that for the maintenance of the hygiene of oral health and the prevention of periodontal disease, these are as important as the treatment of carious lesions.

MATERIAL AND METHOD

427 patients treated in the Prosthodontics Clinic Iasi, Grigore T. Popa Faculty of Dental Medicine of Iasi, during 2005-2008, were examined, contacted by common follow-up methods (by telephone or by letter). The lot thus created was clinically and radiographically examined for the purpose of assessing the survival rate of prosthetic reconstructions and of the accuracy of the treatment executed. Thus, a number of 3163 teeth with various types of fixed prostheses of up to 6 years was examined.

The clinical examination aimed at various bench-marks:

- the assessment of the general periodontal aspect by using the Ramfjord index;
- establishing a type of marginal periodontium (Arnold Weissgold), periodontal scalloped with long papillae and pronounced difference between its level and the gingival margin, flat, uniform periodontal type, with no significant differences in the level;
- establishing the presence of absence of periodontal recessions at their level;
- determining the form of the cervical contour;
- estimating the prosthetic modelling

The radiographic examination was performed in the practice of simple retro-dental-alveolar radiographies and their assessment as follows:

- The assessment of the crown/root ratio and of the level of recession:  
- the assessment of the degree of cervical adaptation;
- establishing the laminae lesions

RESULTS AND DISCUSSIONS

Of the total of teeth examined 42% (1327) were monoradicular teeth and 58% (1836) were pluriradicular teeth. They presented microprostheses in the following proportion: 45,9% semi-physionomic crowns, 40,3% metal crowns and 13,7% metal-ceramic crowns. Organising the practised examinations on types of crowns we may lay down the following results.

In the case of semi-physionomic crowns, which are the most examined, in 12,3% they did not trigger significant periodontal changes, in 55,7% of the cases, the microprostheses have determined periodontal recessions and 32% have determined the emergence of the fungoid inflammatory coronary band.

Regarding the technical performance, the vast majority of semi-physionomic crowns examined (69,5%) presented signs of gingival
The preparations at the level of dental cervix were determined as being end-knife in a proportion of 80.7% and only 19.3% preparations with a threshold. A percentage of 20.2% of the semi-physionomic crowns presented short margins with insufficient subgingival modelling, usually with gingival supracontour and in a percentage of only 10.3% correct microprostheses with gingival finish lines which complied with the intrasulcular morphology and did not trigger periodontal reactions were found.

![Diagram 1: The proportion of crowns examined](image1)

![Diagram 2: The periodontal damage present in the semi-physionomic crowns examined](image2)

![Diagram 3: The discrepancies of the technical performance of the semi-physiological crowns](image3)

![Diagram 4: Results of the examination of metal crowns](image4)

The metal crowns representing a proportion of 40.3% of the total of crowns examined have showed: 24% did not trigger periodontal changes; 49.3% periodontal recessions were present and in 36.6% of the cases plethora and fungoid gingival aspect. Regarding the assessment of the technical performance of the metal microprostheses, the vast majority 80.9% presented difficulties in the cervical adaptation, being wide crowns which damaged the marginal periodontium and which most commonly determined periodontal pockets and inflammation; 13.4% presented short margins, 5.7% presented either residual cement, or marginal polishing uncertainties and only 12.8% normal subgingival contour and good marginal adaptation.

In the case of metal-ceramic crowns examined 82% maintained local inflammatory
signs of plethora of the gingival margins and turgescent, red-violaceous papillae; 10.7% triggered periodontal recessions and only 7.3% presented the periodontium without changes, in 12.3% of the cases, partial decementations with signs of periodontal inflammation were found.

Cumulating the clinical results obtained on the total of examined microprostheses 72.7% of these presented supracontour at the level of the dental cervix, the change of the anatomical initial convexity at the level of sulcus due to the prosthetic treatment, being the most common etiology of the post-prosthetic periodontal recession. In 18.5% of the cases, the microprosthesis presented short margins and in a proportion of 8.8% the microprostheses were accurate. Invasions of the biologic space necessary for the marginal gingiva, by excess or by default of the artificial reconstruction substance are extremely frequent.

The effects of the examined microprostheses on the marginal periodontium have showed alarming data: 85.9% have determined periodontal effects (recessions, plethora, fungoid coronary band) and only 14.5% did not iatrogenically influenced the marginal periodontium.

Interesting results were obtained after the assessment of the underlying periodontal disease. This showed that in a proportion of 39% of the cases, the periodontal aspect was normal and in a proportion of 61% there is a periodontal damage. In patient with a periodontal normality, it was found that in a proportion of 72.7% the microprostheses applied represented a local irritant factor with high risk of triggering the abnormal periodontal disease. In patient with a periodontal damage of 83%, the prosthetic treatment aggravates the underlying periodontal disease and only in 17% of the cases the periodontal disease was stable.

The radiographic examinations have emphasised the following results: 72.7% of the examined microprostheses presented wide crowns with a transversal diameter of the modified cervix and lesions present at the level of the interdental septum. In a proportion of 18.5%, the microprostheses presented short margins and insufficient subgingival modelling and only in 8.8% of the cases the radiographic aspect was normal.

Regarding the periodontal recessions of the total of teeth examined, 79.5% have presented minimum periodontal recessions and 20.4% recessions of over 3mm, with the imminence for the opening of the radicular room. Only in 5% of the cases, the recessions affected half of the radicular length. The existence of pre-existing periodontal recessions in the form of registered periodontal diseases, with the exposure of cement-enamel junction complicates the prosthetic recovery and favours the emergence of certain defective
periodontal effects, similar to the ones occurred in the excessive artificial contour.

In order to cumulate the data provided by this study, we may conclude that the survival rate for the works examined were only of 58% with a failure rate of 42%. Of the total of teeth examined, 64 were extracted, thus 10% failure. The most common failure causes were the periodontal disease in its various forms of manifesting, marginal secondary decays, loss of retention, technical deficiencies and the crease of the reconstruction.

CONCLUSIONS

In mass prosthetic therapy, the directions for the technical performance of microprostheses are not complied with. From the data of dental morphology, at least two elements must be remembered: the sulcus has at least two dimensions which modify with the onset of periodontal recessions. There are variations of the radicular form on the segments in different levels of recessions, extremely important clinical data, which were also not complied with the techniques for the preparation of abutment teeth.

In any prosthetic reconstruction, compliance with the morphology prior to the preparation is primordial. The contour subgingival part of the microprosthesis has a significant influence on the marginal periodontium, the most serious periodontal lesions being triggered by this performance flaw.

The main failure factor is the periodontal disease. The lack of monitoring via follow-up accentuates the devastating effects of it.

SELECTIVE BIBLIOGRAPHY