

A CLINICAL EVALUATION OF THE LEVEL OF DENTAL PLAQUE AT ROMANIAN PATIENTS WITH DENTAL IMPLANTS



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ABSTRACT

Aims: The aim of this study was to assess the level of microbial plaque presented by romanian patients with dental implants for the dental implant prosthetics and for the whole arch presenting dental implants.

Methods: The level of microbial plaque was clinically observed and recorded for a number of 58 patients with dental implants. The patients were selected from two dental offices from Bucharest and from three offices from Ramnicu Valcea. Later on, based on the recordings, the O'Leary plaque index was calculated. This index was calculated first for the whole arch containing dental implants and second only for the dental implant prosthetic elements. The collected data were then statistically analyzed.

Results: The results demonstrated a high overall average plaque index value for both the whole arch and implant prosthetics. The average plaque index value was 52,1% for the arch and 48,4% for the implant prosthetic elements. A number of 15 patients (25,8%) presented peri-implant mucosa affections: bleeding on probing, colour change, mucosal recession or volume alterations in various combinations.

Conclusions: The study demonstrated a poor oral hygienisation and implant maintenance for most of the patients examined. The group of patients cannot be considered representative for the whole romanian population with dental implants, therefore the results cannot be considered valide for Romania. The study also revealed a high percentage of patients with peri-implant mucosa affections, demonstrating the inadequacy of follow-up programmes for patients with implants and the need to develop new programmes aimed at the maintenance of dental implant prosthetics.

Keywords: dental implant prosthetics, oral hygiene, detal plaque index.

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INTRODUCTION

Behavior regarding prosthetic treatment and oral hygienisation has a broad and central role in health. Behavioral interventions can be effectively used to prevent general and local disease, improve management of existing disease, modify dental prosthetic treatment options, increase quality of life, and reduce healthcare costs ¹. The quality of life of a human being is determined among other things by health. Oral health is part of general health. If a person has a poor oral health this may become a handicap and reduce the quality of life ². Alongside with aging, a human often gradually loses dental units for various reasons, reducing the oral function capabilities and affecting the facial esthetics. One of the possibilities to replace the lost dental units is the use of dental implant prosthetics, a modern alternative to the conventional prosthetic treatment. The use of dental implants brings a number of benefits: the replacement of lost teeth without a-

ffecting adjacent teeth, the possibility to make prosthetics on terminal edentulous patients, superior stability, support and maintenance for mobile prosthetics etc. ³. Dental implants and dental implant prosthetics are artificial structures that have an intimate contact with living tissues. This is why the materials we use must have a high biocompatibility ⁴. No matter how high this biocompatibility is, the interface implant - living tissue and prosthetics - living tissue is always sensitive to microbial aggression ⁵. Therefore the oral hygiene of a patient with dental implant prosthetics must always be extremely efficient ⁶. Dental implants have only recently been used on a larger scale in the Romanian population because of the costs of the treatment. Therefore we considered that it could be useful to find out how do a group of Romanian patients maintain their implant prosthetics and manage to control the dental plaque.

AIMS

The aim of this study was to assess the level of microbial plaque presented by Romanian patients with dental implants for the dental implant prosthetics and for the whole arch presen-

ting dental implants. Another objective was to observe and record the prevalence of peri-implant mucosa affections of the examined patients

MATERIALS AND METHODS

The level of microbial plaque was clinically observed (with plaque disclosing agents) and recorded for a number of 58 patients with dental implants. The patients were selected from 2 dental offices from Bucharest and from 3 offices from Ramnicu Valcea. Later on, based on the recordings, the O'Leary plaque index was calculated. This study analyzes the amount of dental plaque recor-

ded in patients with prostheses over implants. The data was recovered from the clinical charts of patients and were statistically analyzed at a later stage.

The inclusion criteria applied for this study were as follows:

1. To have at least one dental prosthesis over implant
2. To have a good periodontal status of the remaining teeth:

- a. *Healthy periodontium*
- b. *Periodontal disease that was treated and stabilized*
3. No occlusal problems
4. The existing dental prostheses have no food retention areas that can't be cleaned during daily oral hygiene
5. Patient doesn't smoke or smokes less than 10 cigarettes a day^{7,8}
6. Patient agrees to take part in the study.

The 58 patients included in the study were over 20 years old. The age distribution was as follows: 9 patients between 20-30 years, 10 patients between 31-40 years, 15 patients between 41-50 years, 17 patients between 51-60 years and 7 patients over 60 years. The study lot included 37 women and 21 men, of which 6 live in non-urban areas and 52 live in urban areas, 14 had secondary education (high-school) and 44 had higher education (university). 47 patients have single crowns over implants, 5 have bridge implants, 2 have linked crowns over implants, 5 have overdentures on bar and 1 patient has overdentures on ball attachments.

The patients were examined and the data was recorded by a single dentist, to avoid different interpretations of the facts.

The 58 patients had a total number of 131 dental implants, with the following distribution: 29 patients had 1 implant, 9 patients had 2 implants each, 7 patients had 3 implants each, 7 patients had 4 implants each, 3 patients had 5

implants each, 2 patients had 6 implants each and 1 patient had 8 implants. Analysis regarding the amount of dental plaque was performed on 85 individual crowns, 6 units of linked crowns, 15 units included in bridges, 28 bar segments and bar connecting elements and 2 ball attachments. The O'Leary index was used to determine the amount of plaque, as this index analyses plaque on all 4 surfaces of a tooth or crown. This kind of data collecting accuracy was needed as microbial induced peri-implantitis can emerge on either side of a dental implant. Also, the O'Leary index refers to plaque in the gingival area of a tooth or crown where it can also come into contact with the implant.

When recording dental plaque on crowns or bridges all 4 lateral surfaces of the crowns or pontics were taken into account. In patients with overdentures on ball attachments each ball was considered to be a single unit comprising of 4 lateral surfaces: buccal, lingual, mesial and distal. In patients with bar overdentures each element of implant attachment was considered as being a crown with 4 lateral surfaces and each bar segment that links the implant attachments together was considered as being a pontic. For each patient a plaque disclosing agent was applied on each analyzed surface and then the O'Leary Index was calculated for both the entire dental arch and just for the implant prostheses.

ETHICAL ISSUES

For this study all patients completed and signed a questionnaire after being informed that they have completed it in order to take part in a scientific study. All patients have been taken pictures after a plaque disclosing agent

was applied on the arch with dental implants. All patients are older than 20 years. Since it was an observational (non-interventional) study we took the signature as the informed consent of the patients' taking part in the study.

RESULTS

The analysis of the studied group revealed that the maximum number of patients¹⁷ was for the group 51-60 years old, most of them were women (37 F compared to 21 M), those with higher education (44 compared to those with secondary 14), and coming from urban areas (54 compared to rural 4). Regarding the number of dental implants, the maximum number of patients was 29 with one implant and as implant supported prosthesis, the most frequent implant prosthesis (85) was one individual crown. The average index of the microbial dental plaque in the dental arches that had implant supported prosthesis was 52.1%.

The average index of the microbial dental plaque in implant supported

prosthesis was 48.4%. A number of 15 patients (25.8%) presented peri-implant mucosa affections as follows: 8 patients (13.7%) with gingival recession with exposure of abutment of about one millimeter, 4 patients (6,8%) with gingival tissue color change and bleeding upon probing, 2 patients (3.4%) with gingival tissue color change, volume change and bleeding upon probing, and 1 patient (1.7%) with gingival volume change.

In terms of distribution on intervals of index plaque we recorded the data presented in Table I.

For the patients with peri-implant mucosa affections was recorded the data presented in Table II, both as type of change and value of the index plaque.

Table 1. Value intervals for the dental plaque index score

Range of values for the microbial dental plaque index	Number of patients - plaque index for implant supported prosthesis	Number of patients - plaque index for the entire arcade
Under 9,9 %	5	0
10 - 19,9%	6	4
20 - 29,9%	9	8
30 - 39,9%	2	10
40 - 49,9%	5	6
50 - 59,9%	9	8
60 - 69,9%	3	8
70 - 79,9%	11	4
80 - 89,9%	4	5
90 - 100%	4	5

Table 2. Dental plaque index score for the patients with peri-implant mucosal affections

Type of peri-implant change	Average score of the plaque index at the implant level
Mucosal recession with exposure of abutment around one millimeter	62,5 %
Mucosal tissue color change and bleeding upon probing	53,55%
Mucosal tissue color change, volume change and bleeding upon probing	23,75%
Mucosal volume change	25%

DISCUSSION

This is one of the first studies made in Romania on plaque index level in adults with dental implant prosthetics. Its purpose was to provide a simple assesment of how a number of romanian patients with dental implants manage to maintain a good oral hygiene. Therefore a simple methodology was used and other oral diseases such as caries and lesions of oral mucosa were not specifically assessed. It can be criticised for a number of reasons, including the lack of a random sample and rather simplistic criteria for including patients in the study. However, the resulting data have provided an overview of oral hygienization for romanian patients treated with implants in the capital city and a smaller city in Romania.

Generally it is considered that the ideal O'Leary plaque index value should be under 10% before periodontics surgery (such as inserting dental implants). To be fair the dental specialists admit that it is quite difficult for a patient to obtain such a low plaque index score and it is admitted that a 10% - 20% score is acceptable. The patient should also be able to maintain the same score after periodontal surgery and prosthetics execution ⁹. Analyzing the recorded data in this study we observe that only 11 of the 58 patients (18,9%) present a good plaque index score for their dental implant prosthetics while 25 patients (43,1%) have an index between 20 and 49,9% and 22 have an index over 50% also for their dental implant prosthetics. Regarding the plaque index score for the whole arch presenting dental implants the scores are even worse: 4 patients (6,8%) between 0 and 20%, 28 (48,2%) between 20 and 49,9% and 26 (44,8%) over 50%. Considering these percentages it is not surprising that the percentage of patients with

peri-implant mucosa affections is 25.8%.

The mean values for the whole arch and for the implant prosthetics are pretty close (52,1% and 48,4%) and this proves that most of the patients don't give a special attention to the implant prosthetics hygienization. This may be due to the lack of interest of the patients or because the medical personnel neglects the oral hygiene education; both reasons could be involved simultaneously.

The patients with bleeding on probing, colour change and gingival volume alterations had a mean plaque index for the implant prosthetics higher than the mean of all the examined patients (the difference was 14.1% at patients with recession and 5.1% at patients with colour change and bleeding on probing). In these two situations the high plaque quantity and the plaque quality (dominant microbial species) may influence pre-implant mucosal inflammation.

Both patients with mucosal volume change and bleeding on probing had mobile prosthesis on implant supported bar and presented a plaque index value below average. In these situations (implant supported bar) the volume change are usually hiperplasia ¹⁰. Though the main reason for the mucosal inflammation is microbial plaque, in these situation the high mucosal volume may determine a significant plaque retention and a rather difficult plaque removal because of the presence of the implant supported bar.

The patient which presented only volume change presented a two ball attachment removable prosthesis. These attachments, unlike the bar, allow a more easier hygienisation and this is how the absence of other mucosal changes can be justified.

The current study has identified a disinterest in oral hygiene at patients with dental implants due to the lack of knowledge or the inability or the unwillingness to follow dispensarization programmes.

Our study revealed a link between poor oral hygiene and implant maintenance on one side and peri-implant mucosa affections on the other. In order

to address this problem it will be necessary to develop follow-up programmes that should seek to:

- raise the awareness of the importance of oral hygiene and dental implant maintenance
- encourage dentists to provide regularly dental examinations and oral hygiene advice for all patients who present dental implant prosthetics.

CONCLUSIONS

The group of patients taken in the study cannot be considered representative for all Romanian patients with dental implants. However it covered all adult age groups, the main implant prosthetics techniques, both genders and two different locations in Romania. Therefore the results should be taken into consideration

No matter what kind of implant prosthetics the patients presented, the main plaque index, both for the whole arch and for implant prosthetics, was much higher than the accepted one for a good implant maintenance.

The study revealed a high prevalence of peri-implant mucosal affections and the risk for the evolution of the recorded ones and development of new ones on short, medium and long term.

The Romanian dentists should be encouraged to provide regularly dental examinations and oral hygiene advice for all patients who present dental implant prosthetics. There is an obvious necessity to develop programmes aimed at improving oral hygiene and implant maintenance for the patients with implant prosthetics.

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