



Assessment of peri-implant health without implant maintenance therapy

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Abstract

Introduction: This study aimed to assess the peri-implant health of patients without maintenance therapy for 3 years.

Materials and Methods: The study sample consisted of 30 patients, from a specialization course, non-smokers, having single implants, and that had not taken antibiotics in the previous 6 months or presented any systemic disease that could interfere with peri-implant health. For comparison purposes, it was selected as control the tooth located in the three opposite side of the dental implant. Clinical examination was carried out by a senior examiner, consisting of the following exams: Visible biofilm, probing depth, clinical/peri-implant attachment level, and bleeding on probing frequency. After data collection, means were calculated for proximal regions and free faces, in addition to a general mean for all data. Data were compared and statistically treated by Student's *t*-test for paired samples and Chi-square ($P < 0.05$).

Results: The data related to the variables under assessment showed no statistical difference between groups ($P > 0.05$).

Conclusion: It was concluded that even without implant maintenance therapy, there were no signals of disease progression in single implants for a minimum period of 3 years.

Introduction

Dental implants have provided the population great benefits. If well planned, this therapy is able to give quality of life to patients,^[1] overcoming a serious public health problem that is teeth loss related to systemic diseases.^[2]

It has been currently known that dental biofilm is able to lead to important problems of the oral cavity^[2] and has contributed to the occurrence of systemic complications.^[3] Similarly to the natural teeth, dental implants are colonized by microorganisms through a dental biofilm that when in the lack of hygiene aids, may produce an inflammatory process around peri-implant structures.^[4]

As chronic periodontitis, peri-implantitis is a tissue destruction of infectious origin. Without proper treatment

it may lead to an inflammatory process named mucositis,^[5] and as a result, peri-implantitis progression may cause implant failure, many times exactly as occur to teeth.^[6] It seems that peri-implant health maintenance is associated to oral hygiene self-care.^[7]

Given this, periodontal health and peri-implant area are of extreme value for any type of restorative/rehabilitative treatment, and aware motivation of patients concerning oral hygiene^[8] becomes undoubtedly a fundamental preventive measure to the longevity of teeth and implants.

The aim of the present study was to assess peri-implant health of single implants performed in a specialization course in implantodontology with no subsequent professional follow-up.

Materials and Methods

This research was previously submitted to and approved by the Ethics Committee at the General University Hospital, under protocol number 2011/037.

Subjects to be included in the study should not have systemic diseases that compromised bone loss and should not be smokers. They had not been under any professional follow-up for more than 3 years, have taken antibiotics in the previous 6 months or have undergone peri-implant or periodontal dental treatment. In addition, the patients should present 25 or more teeth and could not present clinical attachment loss equal to or >6 mm in two or more teeth and probing depth (PD) \geq 5 mm in one or more sites.^[9] At the beginning of the dental appointment, it was performed an intra-oral and extra-oral physical examination, evaluating possible changes or variations of normality of hard and soft tissues. The peri-implant and periodontal clinical criteria used were applied to: (i) The supragingival region, which was assessed in four sites by implant/tooth: Buccal, mesial, lingual, and distal; and (ii) to the subgingival region, in which six sites were assessed by implant/tooth: Mesio-buccal, mesio-lingual, center-buccal, center-lingual, disto-buccal, and disto-lingual.

The supragingival index was established in a dichotomic way as visible or non-visible biofilm. For subgingival parameters, the following variables were investigated: PD (distance from gingival/mucosa margin until the maximum PD); attachment loss (distance from the most cervical portion of the connection of the implant or cemento-enamel junction of the tooth, both until the most apical probing portion); and bleeding on probing, which consisted in observing submucosal/gingival bleeding after removal of the probe from the site.

In order to set a parameter for health, implants were compared to the homologous teeth in a similar position. In the case of missed tooth, the closer homologous one would be selected. Examinations of implants and teeth were carried out by using a periodontal probe (PCp15-Hu-Friedy, Rio de Janeiro, Brazil).

Data were organized and underwent statistical analysis by means of Chi-square test and Student's *t*-test for paired samples, with a significance level of 5%.

Results

A total of 30 patients were included in the study, being 13 male and 17 female. With regard to the supragingival biofilm, plaque index was found to be lower than 25% for both groups ($P > 0.05$). Subgingival bleeding was present in 15% in all evaluated sites ($P > 0.05$).

Data were analyzed as comparisons between average PD and clinical attachment level for free and proximal faces and it also was calculated a general mean between the proximal and free faces, as shown in Table 1. No statistical differences in the exam variables were observed between groups ($P > 0.05$).

Table 1: Measurements performed in subgingival examination (N=30)

Faces	Implant/tooth	Variable	Mean	\pm	P
Proximal faces	Implant	PD	2.21	0.90	>0.05
	Tooth	PD	2.10	1.34	
Free faces	Implant	PD	2.09	0.89	>0.05
	Tooth	PD	2.01	1.48	
Overall	Implant	PD	2.16	0.87	>0.05
	Tooth	PD	2.07	1.36	
Proximal faces	Implant	CAL	1.97	0.44	>0.05
	Tooth	CAL	1.79	0.81	
Free faces	Implant	CAL	1.90	0.62	>0.05
	Tooth	CAL	1.84	0.98	
Overall	Implant	CAL	1.97	0.43	>0.05
	Tooth	CAL	1.80	0.84	
General means of mouth	Tooth and implant	PD	1.44	0.38	>0.05
		CAL	1.78	0.35	

Student's *t*-test for paired samples ($P < 0.05$). PD: Probing depth, CAL: Clinical attachment level, Overall: General mean

Discussion

The findings demonstrated that although patients were not enrolled in an oral health maintenance program, with regular visits to dentist, brushing guidance and motivation, they did not present peri-implant region more diseased when compared with periodontal tissues.

It has been currently understood that oral health maintenance may be better established with regular visits to the dentist, staying, therefore, free from infections either due to implant^[9] or teeth therapy.^[10] Nevertheless, according to a study that used correlation statistical analyses, it seems that among the factors related to implant failure are: Tobacco use, uncontrolled diabetes mellitus, and poor quality of bone.^[11]

A shortcoming of the present investigation was the low size sample. However, we decided to exclude risk factors-related to implant loss,^[12] and to privilege only patient's self-care. In this sense, it seems that single implants are little affected with the absence of a dentist within a 3 year period. Importantly, further assays are needed to address this question, which appears not to be clarified yet.

Another relevant methodological issue is that all implants were under working. It is known that implant success lies on an excellent surgery with osteointegration, adhesion of soft tissues into implants, and proper distribution of occlusal forces.^[13] A fact that could complement the information would be the radiographic assessment of bony ridges. We decided not to publish this data because radiographs were of dubious quality and development process was not standardized. In order to avoid measurement biases in this study, we elected a senior examiner with broad experience in periodontics and rehabilitation with dental implants with kappa de 0.8. The exams carried out herein

were the most described ones in the literature concerning diagnosis and treatment with single implants.^[4,11]

All implants were in occlusion. There have been implant failures related to an inadequate prosthetic planning. Even under adverse conditions, a good planning is able to provide longevity to the treatment.^[14] In this case, no patient presented that problem. Certainly, prostheses of single implants have reached lower failure rates, including loss of bone height similar to the results found in the present study.^[15]

The implants demonstrated similar results when compared to the teeth. Overall, the patients included in the study had good financial condition, good education, little progression of periodontal disease, and the presence of a large number of teeth in the mouth. Despite these data were not included in the results, factors such as those aforementioned seem to be connected to a decreased progression of periodontitis^[16] and consequently peri-implantitis.

Even though, it seems logical that appointments with the dentist maintain a good peri-implant health,^[15] along with good oral hygiene they seem to be the factors most related to peri-implantitis.^[4] Nonetheless, the patients who seek implant therapy somehow are more worried about their oral health, and this factor is in contrast to those patients who are not motivated to perform oral self-care, thus presenting worse hygiene and greater oral health complications, involving their own health perception and self-esteem.^[8]

It is important to point out that the students who conducted the operations were attending the first semester of the specialization course in implantodontology and had relatively little experience on implant therapy. Nevertheless, even performed by inexperienced professionals, the treatment reached satisfactory success rates. It should be clear that is not a goal of this study to connive with lacking of visits to the dentist, but to notice that single-implant treatment is of simple performance and maintenance, with higher bone loss in the 1st year of its installation.

Studies found in the literature have reached a success rate of 90.5% in implant therapy even with the previous history of periodontitis. When there is no clinical history of periodontitis, rates increase to 96.5%. Yet, in case of patients with oral contamination due to periodontitis who undergo therapy, the occurrence of implant failures increases to 28.55%.^[17,18]

Actually, it is noticed how laborious is to perform implant therapy without presence of periodontal contamination, but the benefits for patients are demonstrated and justified by the characteristics of the sample in this study. We found satisfactory findings even with inexperienced professionals executing the implants and lacking professional follow-up.

Conclusion

Based on the methodology used in this study, it was possible to conclude that even without implant maintenance therapy, there were no signals of disease progression in single implants for a minimum period of 3 years.

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Author Contributions

- Tereza Aparecida Delle Vedove Semenoff: Participated in conception and design of the study; acquisition, analysis and interpretation of data
- Alessandra Nogueira Porto: Participated in acquisition of data
- Álvaro Henrique Borges: Participated in drafting the article and revising it critically for important intellectual content
- Evanice Menezes Marçal Vieira: Participated in interpretation of data and revised the article critically for important intellectual content
- Matheus Coelho Bandeca: Participated in analysis and interpretation of data
- Alex Semenoff-Segundo: Participated in conception and design of the study, drafting the article and final approval of the version to be submitted.

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