



ISSN: 2230-9926

Available online at <http://www.journalijdr.com>

IJDR

International Journal of Development Research

Vol. 11, Issue, 04, pp. 46454-46460, April, 2021

<https://doi.org/10.37118/ijdr.21605.04.2021>



RESEARCH ARTICLE

OPEN ACCESS

DENTAL IMPLANTS IN PATIENTS WITH CONTROLLED PERIODONTAL DISEASE: A 15 AND 25 YEARS FOLLOW-UP CASES

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ARTICLE INFO

Article History:

Received 06th January, 2021

Received in revised form

26th February, 2021

Accepted 17th March, 2021

Published online 30th April, 2021

Key Words:

Periodontal Disease;
Periodontal Therapy Maintenance;
Implants; Peri-implant Disease.

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ABSTRACT

The maintenance and success of long-term implants in patients with previous periodontal disease can be complex and depend on several factors. This study present the cases of two non-smoking periodontal patients, with periodical systemic health and average age of 40 years, treated and indicated for dental implants. The classification of periodontal disease in both patients was generalized aggressive periodontitis. After the treatment through basic periodontal therapy and an adequate periodic maintenance of five years, implants were indicated in the regions of tooth loss. Each dental implant was installed according to the location and availability at the time. Thus, follow-up and preservation of the cases was performed every six months until the present moment. The favorable results were observed in the clinical and radiographic evaluations during the follow-up. There were no failures in the implants or material properties, or aesthetic limitations due to discoloration. There was an adequate control of the periodontal disease of patients, and no periodontal complications during the preservation period of the case. It is worth noting that patients with aggressive periodontal disease, when properly treated, can be successfully submitted to implant therapy as long as they are regularly monitored and maintain the periodontal health.

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Citation: Diego José Gambin, Letícia Copatti Dogenski, Andrew Soveral, João Paulo De Carli et al. "Dental implants in patients with controlled periodontal disease: A 15 and 25 years follow-up cases", International Journal of Development Research, 11, (04), 46454-46460.

INTRODUCTION

The characteristics of periodontal diseases consist of pathological changes in the periodontium, characterized by gingivitis and periodontitis. Considering the evolution of periodontitis and the lack of control of the periodontal disease, it may affect the loss of dental elements (Mariotti and Hefti, 2015; Theodoridis et al., 2017; Seki and Hagiwara, 2019). To solve this situation, the Implantology specialty seeks to meet the needs of oral rehabilitation in individuals with single or multiple losses (Eghbali et al., 2018; Achanur et al., 2020), so the individual may obtain aesthetics and function back (Del-Fabbro and Ceresoli, 2014; Windael et al., 2018). A widely discussed view among periodontists is the indication or not of dental implants in individuals affected by periodontal disease. Thus, studies have reported a relative change in the relationship between the control of periodontal disease and the association of implants (Achanur et al., 2020; Rocuzzo et al., 2010; Chrcanovic et al., 2014; Tizzoni et al.,

2014; Frech et al., 2019). It is known that, for Implantology success, some parameters of bone loss should be observed annually (Seki and Hagiwara, 2019; Eghbali et al., 2018; Mengel et al., 2007). A long-term follow-up should be performed (Frech et al., 2019) especially in patients who had an advanced periodontal disease (Tizzoni et al., 2014; Graetz et al., 2018). Specialized professionals should perform a periodical control and positive reinforcements should be notified during the routine dental appointment (Theodoridis et al., 2017; Achanur et al., 2020; Tizzoni et al., 2014; Rasperini et al., 2014). Thus, implantation survival rates and marginal bone loss may present a positive estimate annually and surgical success may be observed (Theodoridis et al., 2017; Graetz et al., 2018). Therefore, this study aimed to present 2 clinical cases in which patients underwent oral rehabilitation with implants and went under periodontal maintenance for 15 and 25 consecutive years, maintaining a controlled periodontal health.

MATERIALS AND METHODS

The present clinical cases reported the periodontal and implant clinical conduct of periodontal and implants inform patients with aggressive periodontal disease, who were initially treated for periodontitis. After controlling for the periodontal disease, implant therapy was planned at the sites of missing and condemned teeth, always maintaining a periodontal and peri-implant maintenance regimen after implant treatment with implants for these patients. Periodontal maintenance therapy consisted of scaling and root planing in the teeth affected and teeth and the periodic motivation to control bacterial plaque. These patients were followed-up clinically every three months for the first three years and after then every six months every year. Radiographic monitoring was also requested annually with panoramic and periapical radiographs. The clinical cases described in these case reports are authorized to disclose the images of patients by the Free Informed Consent Form, under the responsibility of the dentist (M.S.T.). The present cases were performed in the city of Passo Fundo, Rio Grande do Sul, Brazil. The diagnosis of the cases was based on the classification of the American Association of Periodontics (Armitage, 1999). The treatment was planned and performed according to the requirement of each case.

CASE REPORT

Case 1: A female patient (E.M.), 30 years old at the time (06.25.2007), attended the private dental office (M.S.T.) to perform a periodontal treatment and later an implant planning. The anamnesis showed good systemic condition and general health. The periodontal examination due to the presence of bleeding, biofilm indexes in several sites, and probing depth was classified as generalized aggressive periodontal disease. Initially, a basic periodontal treatment was performed by planing, and polishing all dental surfaces, and applying fluoride at the end of the sessions. The patient had 23 teeth and an extensive fixed upper anterior prosthesis supported by only three teeth (Figure 1). After completing the basic periodontal treatment of the patient (10.15.2007), a periodontal maintenance regimen was established and the implementation of three implants was indicated in the region of teeth 13-22 to support the fixed prosthesis on implants, with implants in teeth 11, 13, and 22 (09.11.2008). Tooth 11: 4.3x11.5mm (Conical-external hexagon); tooth 13: 4.3x13mm (Conical-external hexagon) and tooth 22: 3.3x11.5 (External hexagon).

always been stable, with no probing depth greater than 3mm and no peri-implant bleeding. There was also no peri-implant bone loss and no complications during this follow-up period (Figure 3 and 4).

Case 2: A male patient (A.C.), then with com 35 years old (03.27.1995), presented at the private dental office (M.S.T.) to perform periodontal treatment. When performing the anamnesis a good systemic condition and general health were observed. The clinical dental examination showed that the patient had 25 teeth (Figure 5). Upon periodontal examination due to the presence of bleeding, biofilm indexes in several sites, depth of pathological probing was classified as generalized aggressive periodontal disease. Thus, a basic periodontal treatment was started by means of scraping, planning and polishing all sextants after that, a maintenance during every four months in a periodontium of five years. Thus, periodontal disease control and maintenance of periodontal tissues was performed. After seven years of periodontal maintenance, the extraction of teeth 36 and 25 was indicated (07.06.2005). Initially tooth 36 was extracted and it presented extensive endo-periodontal lesion. Along with the extraction of this tooth, bone grafting was performed in the region (08.29.2005). Six months after the bone graft, two implants were installed in the region corresponding to tooth 36: Implant from the brand Conexão - External hexagon (3.75x8.5mm). One year after this procedure, tooth 25 was extracted and the maxillary sinus was lifted in the region of teeth 24 and 25 (03.06.2006). Implants 24 and 25 were installed six months (March 6, 2006) after the extraction of tooth 24 and maxillary sinus lift in the region, with Titanium Fix-Hexagon external implants (3.75x13 mm and 4.0x13 mm, respectively) (Figure 6 and 7). There was also no complications during this follow-up period (Figure 8).

RESULTS

The excellent results observed in the clinical and radiographic evaluations during the fifteen years (case 1) and case 2 for 25 years of follow-up are shown in Table 1. There were no failures in the implants or material properties (such as fractures and cracks), or aesthetic limitations due to discoloration. There was an adequate control of the periodontal disease of patients, good oral hygiene, only physiological bone loss, absence of peri-implant disease, bleeding, and pathological probing depth. Thus, there were no periodontal complications during the preservation period of the case.

Table 1. Representation of the average presence of general periodontal clinical parameters over a 15-year period

| | Clinical parameter | Biofilm index | Bleeding index | Sounding depth | Dental mobility |
|--------|--------------------|---------------|----------------|----------------|-----------------|
| Case 1 | Initial | High | Medium (2-3) | High (4-7mm) | Grade 2 |
| | 0-5 years | Medium | Low (0-1) | Low (3-4mm) | Grade 1 |
| | 6-10 years | Low | Low (0) | Low (1-3mm) | Grade 1 |
| | 11-15 years | Low | Low (0) | Low (1-3mm) | Grade 1 |
| Case 2 | 0-5 years | High | High (2-3) | High (5-7mm) | Grade 2 |
| | 6-10 years | Low | Low (0) | Low (3mm) | Grade 1 |
| | 11-25 years | Low | Low (0) | Low (3mm) | Grade 1 |

After five years, tooth 34 was extracted, as it was periodontally condemned. After the extraction, tooth 35 mesialized, taking the place of teeth 34 and 35, but the patient did not wish to extract it, remaining in this situation for another seven years when finally the patient accepted the extraction and the installation of two osseointegrated implants in the region of teeth 34 and 35 (10.21.2014). Tooth 34: Easy Grip Implant 3.75x8.5- External hexagon (Conexão); tooth 35: Implant Air torque 3.75x10-Internal hexagon (Conexão). Shortly afterwards, the implant corresponding to tooth 26 (5.0x8.5 mm) was installed (Internal hexagon-Air torque Conexão) (Figure 2). It is worth noting that during the entire period of the installation of implants and prostheses on implants, the patient was under a periodontal evaluation and maintenance regimen of three times a year. Supra and subgingival scraping were constantly performed in the sites with a probing depth greater than 3 mm, which kept it healthy periodontally over this time. The peri-implant region has

DISCUSSION

Dentitions damaged by severe periodontal disease often cause problems not only for the patient but also for the dentist, not least regarding the choice of therapy. After the initial (cause-related) therapy and active periodontal therapy, remaining teeth are often mobile and may require splinting to enhance patient comfort or prosthetic rehabilitation to restore function and esthetics (Guarnieri and Ippoliti, 2018). Considering that periodontal disease and the consequent tooth loss negatively affect the quality of life of individuals (Graziani *et al.*, 2019), implant-supported oral rehabilitation is a viable alternative for the replacement of lost dental elements in patients treated periodically (Seki and Hagiwara, 2019; Achanur *et al.*, 2020; Abreu and Rösing, 2007). The decision to maintain the teeth during the planning of periodontal treatment is

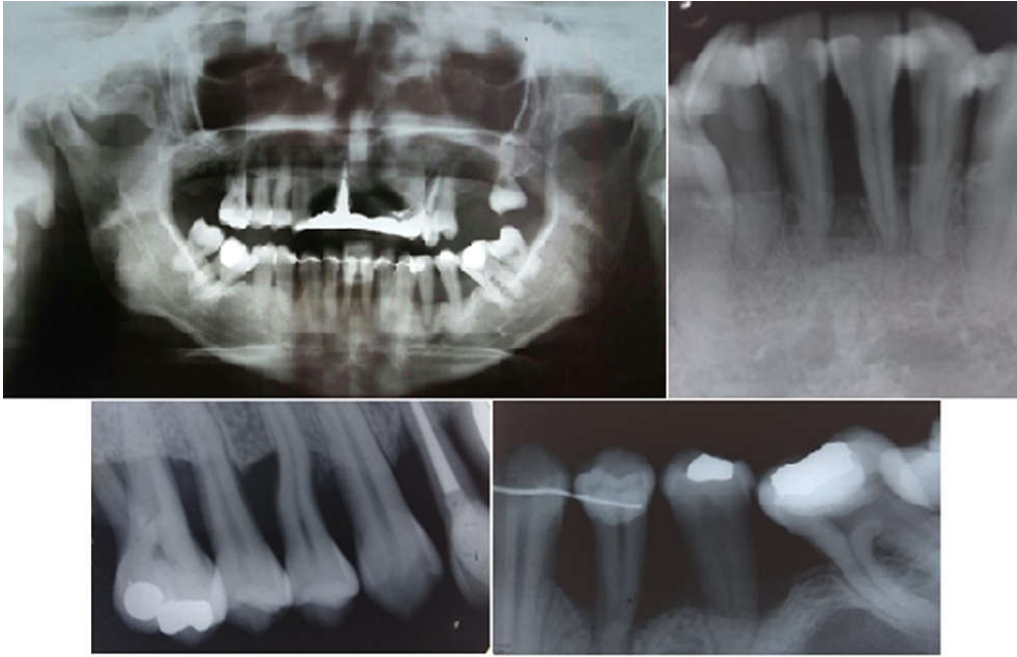


Figure 1. Initial appearance of the RX images extensive fixed upper anterior prosthesis supported by only three teeth



Figure 2. Fixed prosthesis on implants, with implants in teeth 11, 13 and 22. Two osseointegrated implants in the region of teeth 34 and 35 and implant corresponding to tooth 26



Figure 3. Final aspect in frontal and lateral arch



Figure 4. Final radiographics after 15 years (stability of bone crest)



Figure 5. Initial appearance of panoramic RX images. Aggressive periodontal disease and extensive endo-perio lesion in the tooth 36



Figure 6. Initial radiography with root of 15 Radiography after extraction of 14 and 15, with maxillary sinus bone graft with lyophilized bone



Figure 7. Fixed prosthesis on implants in elements 14, 15 and 36-37



Figure 8. Final photos: occlusal, frontal and right side

related directly to the prognosis of these elements (Gomes *et al.*, 2017). In these cases, it should be considered that periodontal and peri-implant diseases occur in different environments but have some similarities such as microbiota, risk factors, and evolutionary pattern (Theodoridis *et al.*, 2017; Achanur *et al.*, 2020; Tizzoni *et al.*, 2014; Quiryen *et al.*, 2001; Kim and Sung, 2012). Thus, in a case-control study that used a methodology similar to the cases in this article, the authors emphasized that dental implants may be indicated to patients showing an adequate periodontal control during the maintenance of the periodontal therapy (Seki and Hagiwara, 2019). Microorganisms such as *Porphyromonasgingivalis*, *Treponemadenticola*, *Staphylococcus aureus*, and *Candida albicans* associated with the inflammatory reaction of the periodontal disease may also be found in sites with peri-implantitis (Klinge and Meyle, 2012; Sanz *et al.*, 2012; Canullo *et al.*, 2016). Once installed, these bacteria may develop an inflammatory process in the bone region surrounding the dental implant, which may lead to localized bone loss if supportive periodontal therapy is not performed (Broggini *et al.*, 2006; Karnik and Pradhan, 2012). The risk factors directly linked to implant treatment may depend on each professional (choice of implant design, implant height) and on the patient's conditions (bone quality, adjacent tissues of the implant, among others). As for the latter, characteristics of oral hygiene and history of periodontal disease are associated with

periodontitis and peri-implantitis (Karnik and Pradhan, 2012; Algraffee *et al.*, 2012). According to a recent systematic review on the topic, with adequate control of the infection in surrounding tissues and with periodontal maintenance therapy, the use of dental implants to replace teeth is not contraindicated for patients who have already undergone periodontal treatment, considering a success rate from 83% to 96% in other long-term studies (Kim and Sung, 2012). Success, however, is complex and difficult to define, and although several criteria have been proposed, including the extent of bone loss, depth of the periodontal probing and bleeding on probing, the expectations of the dentist and/or patient are also a valid outcome measure. Therefore, the health of peri-implant tissues is generally accepted as an important aspect to judge the success of the implant (Smith *et al.*, 2017). Degidi *et al.* (2016) conducted a prospective cohort study (10 years) evaluating the performance of implants with self-tapping apex of internal hexagon with hexagonal connection using immediate loading with partial fixed prostheses. Final gold/ceramic restorations were cemented approximately 28 weeks after implant insertion. Marginal bone level, probing depth of the pocket, percentage of bleeding on probing, biological or technical complications, and any other adverse events were measured annually up to ten years after surgery. Seventy-eight (27.5%) implants placed in 30 patients (26.3%) were lost to follow-up. Eight of 284 (2.8%)

implants failed in 8 out of 114 (7.0%) patients: one (12.5% of the losses) due to failure to perform osseointegration and seven (87.5% of the losses) due to peri-implantitis. At the end of ten years of follow-up, 121 (61.4%) implants exhibited "total success" with an optimal health condition, 21 (10.9%) implants had a "satisfactory survival" condition, while 49 (25, 49%) of the implants were classified as "impaired survival". The authors discussed that no association was found for patients treated with periodontal disease ($P=0.679$). Either way, a clear understanding of the influence, in peri-implant health, of an individual's susceptibility to periodontitis is necessary for successful implant treatment planning. Current evidence points to poor oral hygiene, a history of periodontitis and smoking as the strongest risk indicators for peri-implantitis (Smith *et al.*, 2017). It should be considered that the monitoring of these patients is essential for implant success because they are more susceptible to this condition (Theodoridis *et al.*, 2017; Tizzoni *et al.*, 2014; Graetz *et al.*, 2018; Dreyer *et al.*, 2016). The planning of treatment with implants must take into account recognized risk factors, whether past, present or future (Smith *et al.*, 2017). A case study on the prevalence of implant survival rates up to 10 years of follow-up showed that indices of survival and absence of peri-implantitis were adequate in the 77 patients included in the study. Such results relate to periodontal and peri-implant disease control and adequate oral hygiene (control of biofilm and pathogenic bacteria). Thus, the successful results obtained, which may compare to this study, should be considered, as they are relevant to the positive outcomes in such patients (Francetti *et al.*, 2019). In a study with a similar follow-up time, the authors reported that despite presenting a small sample, the successful results obtained, which can compare to this study, should be considered, as they are relevant to the positive outcomes in such patients (Francetti *et al.*, 2019).

CONCLUSION

Patients with aggressive and advanced periodontal disease who were treated periodontally and maintained their teeth in an adequate and healthy way can receive implants in edentulous spaces.

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