

Clinical Report

Periodontal Conditions in Patients Requesting Dental Implant Treatment

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Abstract

Periodontal disease is considered a risk factor in dental implant treatment. The purpose of this study was to investigate the periodontal conditions in patients requesting dental implant therapy. A total of 169 patients visiting Department of Oral and Maxillo-Facial Implantology at Tokyo Dental College Chiba Hospital were targeted. The following intraoral parameters were measured in each patient: Community Periodontal Index (CPI) score, probing pocket depth (PPD), clinical attachment level (CAL) and bleeding on probing (BOP). Prevalence of patients with periodontal pockets was high: 38% and 28% of patients had a CPI score of code 3 and 4, respectively. Prevalence of teeth with one or more sites with $PPD \geq 4$ mm was 27%. Moreover, clinical signs suggestive of periodontitis ($PPD, CAL \geq 4$ mm) were found in 10–15% of tooth sites. Prevalence rates at sites with severe periodontal breakdown ($PPD, CAL \geq 7$ mm) were 2–5%. These results further emphasize the importance of thorough periodontal assessment in patients prior to dental implant treatment.

Key words: Dental implant treatment—Periodontal condition—
Community Periodontal Index (CPI)—Peri-implantitis—Risk factor

Introduction

Dental implants have been clinically used for more than 40 years. Dental implant therapy is highly effective and is now an indispensable option in the replacement of natural teeth^{2,4,5}. The risk factors for implant therapy have been closely analyzed in recent years. However, the relationship between the suc-

cess of implant therapy and systemic conditions, the intraoral environment or lifestyle habits remains to be fully elucidated. Periodontal diseases are multifactorial disorders involving bacterial, host and environmental factors which eventually lead to tooth loss³. Many patients with missing teeth and who wish to have their oral functions restored often have periodontally involved teeth. In

< **Index teeth of CPI** >

17,16	11	26,27
47,46	31	36,37

< **CPI score** >

code 0	No signs of disease
code 1	Gingival bleeding after gentle probing
code 2	Supra- or subgingival calculus
code 3	Pathologic pockets 4 or 5 mm deep
code 4	Pathologic pockets 6 mm or deeper

$$\text{*Prevalence of each code} = \frac{\text{No. of Patients with each code}}{\text{Total no. of patients}} \times 100(\%)$$

Fig. 1 CPI score

such patients, any remaining teeth affected by periodontal disease may compromise the success of dental implant therapy⁶⁾. Periodontitis is believed to be a risk factor for peri-implant infection¹⁶⁾. Schou *et al.*¹⁷⁾ suggested that although the probability of implant survival in periodontitis patients is high, peri-implantitis cureasily occur and it is better to carry out dental implant treatment after periodontal treatment. Therefore, it is thought important to grasp a patient's periodontal condition at first.

The objective of the present study was to assess periodontal condition in patients requesting dental implant therapy.

Materials and Methods

1. Patients

A total of 169 patients (mean age: 53.4 ± 9.0 years) were randomly selected from patients visiting Department of Oral and Maxillo-Facial Implantology at Tokyo Dental College Chiba Hospital over a 3-year period from May 2005 to May 2008.

The present study was approved by the Tokyo Dental College Ethics Review Board.

2. Periodontal parameters

The following intraoral parameters were measured in each patient: Community Periodontal Index (CPI)¹⁾ score (Fig. 1), probing pocket depth (PPD; measured at 6 sites in each tooth), clinical attachment level (CAL; measured at 6 sites in each tooth) and bleeding on probing (BOP). In this study, eight dentists measured each periodontal parameter. The PPD and CAL measurements were recorded to the nearest millimeter using a North Carolina periodontal probe (PCPNU-15, Hu-Friedy, Chicago, IL, USA).

Results

1. CPI score

The CPI score is shown in Fig. 2. The prevalence rates of patients with code3 and code4 were 38% and 28%, respectively.

2. Periodontal parameters

Table 1 shows the clinical data. A total of 3,528 teeth (169 patients) were included in this study. Mean number of remaining teeth per patient was 21.6. Prevalence of teeth with one or more sites with PPD ≥ 4mm was

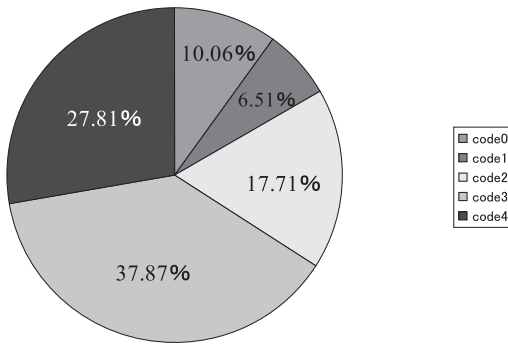


Fig. 2 Distribution of CPI score

27%. Prevalence rates at tooth sites with $PPD \geq 4$ mm and $PPD \geq 7$ mm were 9.7% and 1.7%, respectively. Prevalence rates at sites with $CAL \geq 4$ mm and $CAL \geq 7$ mm were 15.7% and 4.3%, respectively. Approximately 14% of sites showed BOP.

The results showed that $26.93\% \pm 27.8\%$ of remaining teeth were periodontally affected (had one or more sites with a $PPD \geq 4$ mm).

Discussion

The demand for dental implant therapy continues to grow. Many cases have shown long-term success and high 10-year survival rates have been reported⁷. However, many implant failures have also been documented¹², and severe periodontitis is believed to affect dental implant survival.

Periodontal diseases are multifactorial disorders involving host, bacterial and environmental factors, and are considered a risk factor for peri-implantitis. The risk factors for peri-implant infection and periodontitis often coincide, thus further supporting the correlation between periodontitis and peri-implantitis.

The average number of remaining teeth in the patients in this study was approximately 22, indicating that each patient had lost approximately 6 teeth on average for various reasons including periodontal diseases. Miyazaki *et al.*¹³ reported that the average frequencies of

Table 1 Clinical parameters

Total number of teeth	3,528
Number of present teeth	21.62 (5.17)
PPD; mm	2.57 (0.69)
CAL; mm	2.92 (1.20)
PPD ≥ 4 mm (% sites)	9.69 (14.33)
PPD ≥ 7 mm (% sites)	1.68 (3.70)
CAL ≥ 4 mm (% sites)	15.67 (16.69)
CAL ≥ 7 mm (% sites)	4.26 (13.34)
BOP; % sites	14.41 (19.20)

Data are shown as mean (SD).

CPI Codes 3 (shallow PPD) and 4 (deep PPD) were 37% and 21% in the 45–64 years old group, respectively, and in the present study, the corresponding values were even higher at 38% and 28%, respectively. This may be because, unlike previous epidemiological studies, the present study investigated patients requesting dental implants for replacement of missing teeth or some other reasons.

In the patients of the present study, approximately 27% of remaining teeth were periodontally affected (had one or more sites with a $PPD \geq 4$ mm). The percent of sites with BOP was 14%, while 10–15% of tooth sites were periodontally involved, and 2–5% of tooth sites exhibited severe periodontal break down ($PPD, CAL \geq 7$ mm)¹⁸.

Approximately 5–10% of the world population has severe periodontitis^{15,22}. A significant difference was found in the prevalence of peri-implantitis between patients in whom teeth were extracted due to periodontitis and those in whom teeth were not extracted due to periodontitis¹¹. Moreover, microbiological studies have reported a correlation between implant loss and bacterial infection^{14,20}. However, other studies that followed could not support these findings, and favorable outcomes have been documented for many patients with severe periodontitis^{19,21}. Researchers have found that the effects of a past history of periodontitis on the prognosis of implant therapy were low with proper dental plaque control^{8–10}. Both aggressive periodontitis and severe

chronic periodontitis are considered to be a contraindication for implant therapy. Differential diagnosis of aggressive and severe chronic periodontitis can be difficult, and so far, few studies have investigated longitudinally investigated success rates of implant therapy in such patients.

No general consensus has been reached on the relationship between periodontal diseases and peri-implantitis. However, many patients with periodontal diseases wish to have dental implants, and some patients inevitably experience severe peri-implantitis. Therefore, it necessary to establish standards for evaluation of periodontal disease (especially in relation to severe chronic periodontitis and aggressive periodontitis) prior to implant therapy and accumulate data to shed light on the causes of peri-implantitis. In conclusion, the findings of the present study underscore the importance of thorough assessment of a patient's periodontal status prior to implant treatment.

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