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"Evaluation of Periodontal Disease in Teeth Adjacent to Implant with Peri-Implantitis- A Clinical Study".

[1]Dr. Mohammad Jalaluddin, [2]Dr. Mohamed Abd-Ellatif El-Patal, [3]Dr. Barakat IF, [4]Dr. Khaled M. Alzahrani, [5]Dr. Adel Fathi, [6]Dr. Abdelraheem Ramadan Elgendy,

[1]Professor, Department of Periodontics and Oral Implantology, Kalinga Institute of Dental Sciences, KIIT Deemed to be University, Bhubaneswar, Odisha, India
[2]Associate Professor in Pedodonics and oral health, Department of Pedodontics and oral health, College of dentistry, Al-Azhar University, Cairo, Egypt. And Assistant Professor in Paediatric Dentistry, Department of Preventive Dental Sciences College of Dentistry, Prince Sattam Bin Abdulaziz University Alkharj, Saudi Arabia.
[3]Associate Professor in Pedodonics and oral health, Department of Pedodontics and oral health, College of dentistry, Al-Azhar University, Cairo, Egypt
[4]Assistant Professor, Department of Prosthetic Dental sciences College of Dentistry Prince Sattam Bin AbdulAziz University 11942 Alkharj Saudi Arabia
[5]Associate Professor in Pedodonics and oral health, Department of Pedodontics and oral health, College of dentistry, Al-Azhar University, Cairo, Egypt
[6]Lecturer Oral Medicine & Periodontology, Faculty of Dentistry, Al-Azhar University, Cairo, Egypt.
Corresponding Author: [1]Dr. Mohammad Jalaluddin (drjalal1979@gmail.com**)**

Abstract:
Aim: Aim of the present study was to evaluate the periodontal disease in teeth adjacent to implant with peri-implantitis.
Materials and Method: A total of thirty participants in the age range of 25–45 years were enrolled in the present study. Sample sizes of thirty participants were calculated based on pilot study. Informed consent was obtained from all the participants. Inclusion and Exclusion criteria were implied to select the participants. Depending upon presence or absence of peri‑implantitis, participants were divided into two groups. Group A (15) was with peri‑implantitis and group B (15) was without peri‑ implantitis. In all participants, William graduated periodontal probe was used to calculate the probing depth (PD) around the implant as well as around the teeth adjacent to the implant. Parameters such as Bleeding on probing (BOP), Pocket probing depth (PPD), and Clinical attachment loss (CAL) were assessed.
Results: The present study consists of total 30 participants **(**12 males' and18 females) with dental implants. Clinical attachment loss was 5.48 ± 0.26 in group A and 3.98 ± 0.18 in group B (P = 0.001) around implants. Pocket probing depth (PPD) was 4.56 ± 0.37 in group A and 2.84 ± 0.10 in group B around adjacent teeth (P = 0.001). Bleeding on probing (BOP) was 2.72 ± 016 in group A and 0.98 ± 0.14 in group B.
Conclusion: The present study concluded that, as peri-implant diseases have increased prevalence in clinical practice, teeth adjacent to dental implant plays an important role in deciding the success or failure of implant. Maintenance of periodontal health is of paramount importance for successful implant therapy.
Keywords: Implants, peri‑implantitis, periodontal diseases, probing depth.

Introduction:

Extraction of permanent teeth is carried out for several reasons, including caries, periodontal disease, fractures, orthodontic/ prosthetic purpose, and extensive internal or external tooth resorption. Pathologic resorption of teeth has a multifactorial etiology although many aspects remain unclear and can lead to tooth loss.[1] The use of dental implants has become a predictable strategy for replacing missing teeth, and the satisfactory results reported by numerous clinical studies have determined an enormous development of implantology.[2]

Oral implants are currently an essential and routine part of any dental practice. Yet despite their formidable success, complications and failure rates have been progressively rising. Peri-implantitis is one of the most common biological complications affecting functional implants. It is a destructive

inflammatory disease associated with pocket formation and peri-implant bone loss.[3] Marginal bone level changes after initial remodelling, accompanied by bleeding on peri-implant probing (BOP), are recommended for its diagnosis. Periimplantitis affects around 13% of implants and 18.5% of patients, with its incidence rising from 0.4 to 43.9% within 3–5 years. However, the disease affects different subjects and different implants at variable rates. Despite its predominantly bacterial aetiology.[4]

Peri-implant diseases are not evenly distributed among patients treated with dental implants, preferentially affect groups which patient profiles are at high risk for their establishment and development. The clinical and microbiological similarity between periodontal disease and peri-implantitis gave rise to more research with dental implants installed in periodontally compromised patients. The possibility of transmission of periodontal pathogens to peri-implant sites in partially edentulous individuals with a history of periodontal disease could be considered a risk factor for the development of peri-implant diseases.[5]

Despite advances in the area, the systematic review by Derks and Tomasi[6] shows there are no clear diagnostic criteria for peri-implant mucositis or peri-implantitis in the scientific literature. The lack of diagnostic criteria used to describe the peri-implant diseases makes it difficult to compare results, and the studies present a great variability in the reports. so the present study was conducted to evaluate the periodontal disease in teeth adjacent to implant with peri-implantitis.

Materials and Methods:

The present study was conducted in the department of Periodontics, Kalinga Institute of Dental Sciences, Bhubaneswar, India. A total of thirty participants in the age range of 25–45 years were enrolled in the present study. A sample size of thirty participants were calculated based on pilot study. Informed consent was obtained from all the participants.

Inclusion criteria was participants with dental implants, evidence of periodontitis with bleeding on probing, >4.5 mm pocket depth, clinical and radiographic presence of bone loss, presence of atleast one teeth adjacent to implant (either mesial or distal), and in opposing arch. Patients who received dental implants on posterior ridge in either of the arch in the last 6 years were enrolled in the study. Information of patient home care and smoking habit was recorded. Patients with prior periodontal surgery, history of systemic conditions like diabetes, patients under medications, edentulous opposing, and contralateral arch were excluded from the study.

Depending upon presence or absence of peri‑implantitis, participants were divided into two groups. Group A (15) was with peri‑implantitis and group B (15) was without peri‑ implantitis. In all participants, William graduated periodontal probe was used to calculate the probing depth (PD) around the implant as well as around the teeth adjacent to the implant. Teeth adjacent to implant site were evaluated for bone and periodontal condition.

Further, for the purpose of evaluation of each implant individual, parameters such as Bleeding on probing (BOP), Pocket probing depth (PPD), and Clinical attachment loss (CAL) were assessed.

Statistical analysis:

Statistical analysis was performed with SPSS 20 (statistical Package for Social Science, IBM, USA). Data presented as means and standard deviation (SD) values. Analysis was done using *t*-test. The significant level was set at $P \leq 0.05$.

Results:

Table 1: Bleeding on probing status around implants and at adjacent teeth

	Group A (Mean±SD)	Group B (Mean±SD)	t value	p value
Around implants	2.72 ± 0.16	0.98 ± 0.14	4.16	0.001*
Adjacent teeth	2.04±0.02	0.62±0.09	3.72	0.001*

Table 1 shows bleeding on probing status around implants and at adjacent teeth. The more bleeding on probing around implants and at adjacent teeth was found in group A (2.72±0.16, 2.04±0.02) compared to group B (0.98±0.14, 0.62±0.09). And there was a statistically significant difference found between the groups.

Table 2: Pocket probing depth status around implants and at adjacent teeth

	Group A (Mean±SD)	Group B (Mean±SD)	t value	p value
Around implants	4.56 ± 0.37	2.84 ± 0.10	3.96	0.001*
Adjacent teeth	3.14± 0.80	2.78± 0.12	4.34	0.126

Table 2 reveals pocket probing depth status around implants and at adjacent teeth. The more pocket probing depth around implants and at adjacent teeth was found in group A (4.56±0.37, 3.14±0.80) compared to group B (2.84±0.10, 2.78±0.12). And there was a statistically significant difference found around implants.

Table 3: Clinical attachment loss status around implants and at adjacent teeth

	Group A (Mean±SD)	Group B (Mean±SD)	t value	p value
Around implants	5.48 ± 0.26	3.98 ± 0.18	5.89	0.001*
Adjacent teeth	4.28±0.19	3. 10±0.07	3.27	0.001*

The maximum clinical attachment loss around implants and at adjacent teeth was found in group A (5.48±0.26, 4.28±0.19) compared to group B (3.98±0.18, 3.10±0.07). And there was a statistically significant difference found between the groups ($p<0.001$). [Table 3]

Discussion:

The soft tissue condition around an implant may influence its susceptibility to peri-implant disease. Patients with thin periodontal phenotypes are more prone to peri-implant mucosal recessions. The exposure of an implant's rough surface to the oral cavity complicates plaque control and enhances bacterial adhesion, thus leading to a potential increase in its susceptibility to peri-implantitis. A recent clinical study had demonstrated a significant association between thin biotypes and the severity of peri-implantitis.[7]

With the increase in the popularity of implants, the major concern comes into consideration are the common biological complications such as peri-implant mucositis and peri-implantitis. Currently, many studies are being directed, keeping in mind the longevity of various implant-supported rehabilitation therapies. Peri-implant mucositis is the reversible inflammation of the soft tissue surrounding the implant, but peri-implantitis includes both soft-tissue inflammation and loss of supporting bone structure around the functional implant.[8]

Zitzmann and Berglundh[9] in their study found 28‐56% of prevalence of peri‐implant diseases among patients and 12‐43% around dental implants. They suggested that the chances of peri‐implantitis are higher among those who have periodontal diseases as compared to healthy one. Peri‐implant mucositis and peri‐implantitis are two peri‐implant diseases which affects the treatment outcome. Peri‐implant mucositis is inflammation of mucosa adjacent to implant and peri‐implantitis is inflammation around implant characterized by bone loss. Klokkevold *et al.*[10] in their systemic review revealed that periodontitis is among various risk factors for peri‐implantitis and periodontitis has a negative influence on survival rate of dental implants.

Salvi and Lang[11] stated in their report that there are controversies among researchers in the characterization of peri-implantitis related to PPD. Pocket depth changes can be identified by knowing the initial placement bone level on radiograph and then comparing it to the level after 1 year and then so forth. Gualini *et al*.[12] also reported that it is widely stated that probing depth in peri-implantitis diagnosis should be confirmed by radiographic bone loss also. Limitation of our study is smaller sample size in small geographic area. Further, long-term clinical study on larger sample on different geographical area is required.

Conclusion:

The present study concluded that, as peri-implant diseases have increased prevalence in clinical practice, teeth adjacent to dental implant plays an important role in deciding the success or failure of implant. Maintenance of periodontal health is of paramount importance for successful implant therapy.

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