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Evaluating the Correlation between Periodontal Status of Teeth Adjacent and Contralateral to Implant with Peri-Implantitis - A Retrospective Study

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ABSTRACT

Background: Previous history of periodontitis associated with smoking and poor oral hygiene are considered as one the risk factor for peri-implantitis which in-turn leads to implant failure. Periodontitis is regarded as the most prevalent infectious diseases with around 75% of adults being affected. A similarity between the pathogenesis of periodontitis and peri-implantitis is as a result of intra-oral translocation of periodontal pathogen from teeth showing periodontitis to the peri-implant niche.
Aim: The main aim of the study is to evaluate the prevalence of peri-implantitis in patients suffering from periodontitis.
Material and Methodology: A retrospective study was conducted in the department of periodontology on 30 patients suffering from periodontitis and with dental implant insertions. In all the patients, periodontal and bone conditions were evaluated. Probing depth, gingival recession, clinical attachment levels, and radiographic bone loss was calculated around the implants, adjacent teeth and contra-lateral teeth to evaluate correlation between periodontitis and implant failures.
Results: On evaluation of results with 30 patients, periodontal depth, clinical attachment levels, and gingival recession showed statistically significant around implants when compared with the periodontal parameters around the adjacent teeth and contra-lateral teeth. Non significant results were obtained when radiographic bone loss was evaluated.
Conclusion: Within the limitations of the study, it was concluded that dental implant therapy is strongly affected by the periodontal health and health of adjacent teeth plays an important role in determining the failure or success of the implant while contra-lateral teeth have no or minimal relationship between periodontitis and implant failure.

Keywords: Implant, Oral Health, Peri-Implantitis, Periodontitis, Translocation.

INTRODUCTION

The sixth European workshop on periodontology presented diabetes, lack of oral hygiene, smoking and history of periodontitis as the risk indicator for implant survival which led to peri-implantitis.[1] Any previous history of periodontitis usually influences the success rate in implant dentistry. 96.5% of implant survival rate was present in patients with no history of periodontitis while when compared with individuals with the history of periodontitis the survival rate reduced to only 90.5%.[2] Interesting, periodontal diseases is considered as the main cause of dental loss in approximately 95% of Indian population, needing oral rehabilitation.[3]

Now-a-days, management of missing teeth is no longer considered a complicated procedure. From last few decades, a transition in the field of dentistry has been seen with the change in trends from patients preferring fixed partial denture to implants over partial denture. The use of dental implants has brought revolution and advancement in the treatment of missing teeth.[4] The long-term survival rates of implants, have made them as the choice for the dentist as well as the patients. A survival rate of around 95% in 5 years has been contemplated as a successful treatment in dental implant patient.[5] However, implant failure still exists.

Any imbalance in the bacterial component of plaque usually leads to periodontitis. Its prevalence usually drives it through as the most pervasive infectious diseases found in the community. Risk factors associated with periodontitis are often also considered as the risk factors for causing peri-implantitis and late dental implant failures which in-turn are usually due to biomechanical forces or peri-implantitis.[6] Though peri-implantitis is defined as an inflammatory process leading to deformation of the peri-implant pocket and bone loss around implant in function (implant basis) while periodontitis is defined as the individual with one or more tooth showing alteration in the classical measures of bone along with additional parameters of pocket depth and bleeding on probing (subject basis).[7] Thus, making the main aim of our study to evaluate the prevalence of peri-implantitis in periodontitis patients who have undergone implant therapy.

MATERIAL AND METHDOLOGY

A retrospective study was conducted on 30 periodontitis patients aged between 35-65 years old who have undergone implant therapy six years back, in the Department of Periodontology and Implantology, BRS, Dental, College and Hospital, Panchkula. Systemically healthy patients, with evident periodontitis, pocket depth of >5mm, clinical and radiographic bone loss and bleeding on probing were included for the study. One of the major criteria for selection was presence of adjacent teeth either mesial or distal and contra lateral teeth for comparison around the implants. Patients with any prior history of periodontal surgery, systemic conditions like diabetes or under any medication, and/or missing teeth (contra-lateral or adjacent) were excluded from the study. A brief description of the study was given to the patients and an informed consent was signed before their enrollment. Required ethical clearance was obtained from the ethical committee of the college. A complete clinical and radiographic examination of the patient was done and on the basis of the peri-implantitis they were placed into two groups. In group A, patients had peri-implantitis and in group B, patients with no peri-implantitis were included.

Clinical parameters were evaluated using a graduated periodontal probe (William probe). Periodontal probing depth (PPD) was measured as the distance from the gingival margin to the base of the pocket, gingival recession (GR) as the distance from the gingival margin to cement enamel junction, clinical attachment level (CAL) as the distance from gingival margin to base of the pocket minus the distance from gingival margin to cement enamel junction (periodontal probing depth-gingival recession), radiographic bone loss (RBL) as the radiographic distance from the visible bone to cement-enamel junction. All the parameters were measured, around the implant, adjacent tooth (mesial or distal) and contra-lateral tooth

Statistical analysis

The measured data was concise into an excel sheet and statistical analysis was done using SPSS Software version 20.0. Frequencies and percentages with mean and standard deviation was done to evaluate the results and a p-value of less than 0.05 was considered to be significant. ANOVA test was used to evaluate the two groups.

RESULTS

Table 1: Demographic Distribution of Study Patients

Parameter		Frequency	Percentage	MEAN±SD
Gender	Male	19	63.34	1.367±0.490
	Female	11	36.66	
	Total	**30**	**100**	
No. of Implants Per Patient	1	18	60	1.400±0.498
	2	12	40	
	Total	**30**	**100**	
AGE	35-45	6	20	2.433±0.817
	46-55	5	16.66	
	56-65	19	63.34	
	Total	**30**	**100**	
Grouping	Group A	26	86.67	1.133±0.346
	Group B	4	13.33	
	Total	**30**	**100**	
Jaw of Implant Located	Maxilla	14	46.66	1.533±0.507
	Mandible	16	53.34	
	Total	**30**	**100**	
Side of Implant Insertion	Right	21	70	1.300±0.466
	Left	9	30	
	Total	**30**	**100**	
Status of Periodntitis	Stage I	5	16.66	1.833±0.379
	Stage II	25	83.34	
	Total	**30**	**100**	

Table 2: Representing the Periodontal and Peri-Implant Status

Parameters	Dental Implant	Adjacent Teeth	Contra-Lateral Teeth
	MEAN±SD		
PPD	5.22±0.14	4.21±0.07	3.22±0.42
GR	0.61±0.71	0.81±0.91	0.91±0.92
CAL	5.76±0.44	4.01±1.13	3.28±1.04
RBL	3.01±0.21	2.82±0.11	2.65±0.10

Table 3: Representing Periodontal Status around Implants in Both Groups

Parameters	Group A	Group B	P-Value	Significance
	MEAN±SD			
PPD	5.34±1.23	2.85±0.93	0.03	S
GR	0.62±0.70	0.50±0.65	0.000	HS
CAL	5.92±0.62	3.15±0.61	0.001	HS
RBL	3.05±0.11	2.72±0.10	0.02	S

S: Significant, HS: Highly significant.

Table 4: Representing Periodontal Status around Adjacent Teeth in Both Groups

Parameters	Group A	Group B	P-Value	Significance
	MEAN±SD			
PPD	3.22±1.02	2.22±0.98	0.01	S
GR	0.80±0.96	0.74±0.87	0.03	S
CAL	4.14±1.16	2.05±1.05	0.001	HS
RBL	3.11±1.09	2.11±0.86	0.52	NS

S: Significant, HS: Highly significant, NS: Non-significant

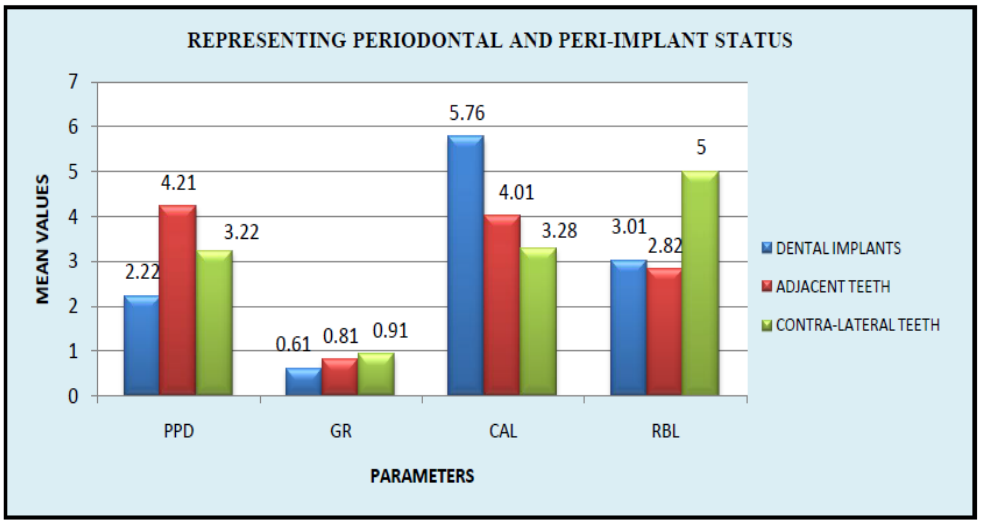
Table 5: Representing Periodontal Status around Contralateral Teeth in Both Groups

Parameters	Group A	Group B	P-Value	Significance
	MEAN±SD			
PPD	3.18±1.20	2.68±0.81	0.02	S
GR	0.80±0.28	0.94±0.73	0.012	S
CAL	4.40±0.92	3.05±0.95	0.01	S
RBL	3.01±.79	2.10±0.78	0.25	NS

S: Significant, HS: Highly significant, NS: Non-significant

Out of 30 patients, 19 were males and 11 were females with mean and standard deviation of 1.367±0.490. Patients ranged from the age group from 35-45 with 6 patients, 46-55 with 5 and 56-65 with 19 patients and mean ± S.D of 2.433±0.817. The patients were segregated on the basis of peri-implantitis group A with 26 patients and with no peri-implantitis as group B with 4 patients (TABLE 1). Periodontal pocket depth around implant (5.22±0.14), adjacent teeth (4.21±0.07), and contra-lateral teeth (3.22±0.42), it was found to be statistically significant with p=0.02. Gingival recession

(GR) shows statistically significant difference with a p=0.01 around implants (0.61±0.71), adjacent teeth (0.81±0.91), and contra-lateral teeth (0.91±0.92). Clinical attachment loss (CAL) was found to be around 5.76±0.44, 4.01±1.13, and 3.28±1.04 respectively around implant, adjacent teeth, and contra-lateral teeth, which showed statistically significant difference of p= 0.05. Radiographic bone loss (RBL) was 3.01±0.21, 2.82±0.11 and 2.65±0.10 around dental implants, adjacent teeth and contra-lateral teeth respectively (TABLE 2). Table 3, 4 and 5 represents the mean and p value around implants, adjacent teeth and contra-lateral teeth individually.



DISCUSSION

The introduction of implant dentistry dates back to more than 50 years ago and is one of the routine procedures followed for replacing the missing tooth. Despite relatively high survival rate, peri-implantitis still lead to a number of potential issues including pain, additional cost associated surgical and non surgical treatments. Peri-implantitis is a multi-factorial disease with a point of emergence of infection. Both periodontitis and peri-implantitis share a common risk factor and periodontitis in-turn is considered as an important risk factor for the development of peri-implantitis. Many studies conducted by various authors like Sung et al in the year 2018 have proved that subjects with a history of periodontitis had a higher risk of developing peri-implantits.[8] Bone loss experienced by periodontally compromised individuals is usually extensive which led to more implant loss and more peri-implantitis.

The present study mainly aimed at evaluating the effect of periodontitis in patients with dental implants in terms of periimplantitis. A prevalence of 25-56% of peri-implantitis was found among patients and 12-43% around the implants in a study conducted by Berglundh and Zitzmann, suggesting that the possibility of peri-implantitis are usually higher among the individual with periodontal disease as compared to healthy ones.[9] In a meta-analysis reviewed by, Klollevold et al revealed that periodontitis can be considered as the risk factor for peri-implantitis and it can has a negative impact on the durability of dental implants.[10] Wang et al, in their study evaluated the relationship between periodontal and peri-implant condition and found that around 58% of the patients with 120 implants had more peri-implantitis when the gingival score was more than 3 and concluded that implant health is adversely affected by periodontal health.[11]

In our study, clinical attachment level was higher in patients with peri-implantitis when compared with patients without it (Group A vs Group B), suggesting that the risk of peri-implantitis was found to be more with patients

suffering from the periodontal diseases. Consequently, periodontal pocket depth, gingival recession, clinical attachment levels and radiographic bone loss was statistically significant when compared with and without periodontitis. Similar results were obtained in the study conducted by Sung et al where they evaluated the periodontal and peri-implant health of the adjacent tooth to the implants with and without peri-implantitis concluding that peri-implantitis was significantly correlated with the periodontal reading of the remaining teeth.[8] Dinzin et al, in his systematic review concluded that any history or diagnosis of periodontitis was strongly associated with the occurrence of peri-implantitis and is considered as one of the strongest risk factor in determining the presence of peri-implantitis for various preventive strategies.[12]

In a study, conducted by Kandasamy et al various clinical parameters were evaluated during the maintenance phase of implants and they conducted their results with the fact that etiological factors should be considered in the success of implants.[13] Irshad et al and Mumcu et al in their individual review papers stated that the accurate knowledge of risk factors for the development of peri-implantitis in patients with history of periodontitis is important for the clinicians to provide a detailed treatment plant to high risk patients.[14,15]

Thus, the present study also concludes with the fact that periodontitis strongly affects the dental implant therapy outcome. An important role is played by the periodontal health of adjacent teeth, which helps in deciding the success and failure of implants. Maintenance of oral hygiene, avoiding smoking and alcohol, early treatment of periodontal diseases and maintaining systemic health can help in providing better prognosis.

Limitation: the main limitation being the sample size, which can be improved by conducting further long-term studies with inclusion of many other factors also. One of the major reasons being covid pandemic, not many patients visited the dental hospital for any treatment. Less awareness about maintenance of the oral and implant health can also be considered as the limitation.

CONCLUSION

Within the limitations of the study, it can be concluded that patients with the history of periodontitis are the possible candidates for developing peri-implantitis, irrespective of age, gender, site of placement and number of implants. The only and the best way possible to decreases these conditions are to consider the patients pattern to maintain oral hygiene and shortening of the follow-ups to achieve successful results.

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