International Journal of Research in Health and Allied Sciences
Journal home page: www.ijrhas.com
Official Publication of "Society for Scientific Research and Studies" [Regd.]
ISSN: 2455-7803

ORIGINAL RESEARCH

Assessment of the clinical and microbiological status of osseointegrated dental implant with that of a natural tooth- A clinical study

Ashish Pandey[1], Pratik Prakash Bumb[2], Anu Vashisht[3], Subham Kumari[4], Ojas Kumar Singh[5], Gagandeep Kaur[6]

[1]Head of the Department of Prosthodontics, Daswani Dental College & Research Centre, Kota Rajasthan;
[2]PG 1st year Department of Prosthodontics, Teerthanker Mahaveer Dental College and Research Center, Moradabad, Uttar Pradesh;
[3]Final year Post graduate student, School of Dental Sciences, Sharda University, Greater Noida, U.P.;
[4]BDS (Buddha Institute of Dental Sciences and Hospital, Patna), Fellow in Academy of General Education,Manipal Private Practitioner, Patna, Bihar;
[5]BDS (Rama Dental College and Hospital, Kanpur); Fellow in Academy of general education, Manipal Private Practitioner, Kanpur, Uttar Pradesh;
[6]BDS final year, ITS Dental College, Muradnagar, Ghaziabad, Uttar Pradesh

ABSTRACT
Background: Periodontitis is characterized by periodontal bone loss, tooth mobility and ultimately exfoliation of teeth. Plaque accumulation around teeth is the reason for periodontal breakdown. The present study was conducted to assess the clinical and microbiological status of osseointegrated dental implant with that of a natural tooth. **Materials & Methods:** The present study was conducted in the department of Periodontics. It comprised of 20 patients (12 males and 8 females). Patients were divided into 2 groups. In group I patient, subgingival plaque sample was collected from subgingival site around implant and in group II subgingival plaque sample was collected from a subgingival site around natural tooth distal to implant. Parameters such as plaque index, sulcus bleeding Index probing pocket depth were recorded. **Results:** The mean probing depth in positive samples of porphyromonas gingivalis in group I was 4.38 and in group II was 3.65, sulcular bleeding index was 1.62 in group I and 1.03 in group II and plaque index was 2.10 in group I and 1.76 in group II. The difference was non- significant (P> 0.05). The mean probing depth in positive samples of prevotella intermedia in group I was 4.15 and in group II was 3.81, sulcular bleeding index was 1.48 in group I and 1.02 in group II and plaque index was 2.04 in group I and 1.71 in group II. The difference was non-significant (P> 0.05). The mean probing depth in positive samples of Tannerella forsythia in group I was 4.62 and in group II was 4.54, sulcular bleeding index was 2.06 in group I and 1.52 in group II and plaque index was 2.30 in group I and 2.18 in group II. The difference was non- significant (P> 0.05). **Conclusion:** Authors found that there was correlation between microorganisms such as Porphyromonas gingivalis, Prevotella intermedia, Tannerella forsythia and sulcular bleeding index, plaque index, and periodontal pockets.
Key words: Porphyromonas gingivalis, Prevotella intermedia, Tannerella forsythia.

Received: 20 February, 2020 Accepted: 26 March, 2020

Corresponding author: Dr. Ashish Pandey, Head of the Department of Prosthodontics, Daswani Dental College & Research Centre, Kota Rajasthan, India

This article may be cited as: Pandey A, Bumb PP, Vashisht A, Kumari S, Singh OK, Kaur G. Assessment of the clinical and microbiological status of osseointegrated dental implant with that of a natural tooth- A clinical study. Int J Res Health Allied Sci 2020; 6(2):59-62.

INTRODUCTION

Periodontitis is characterized by periodontal bone loss, tooth mobility and ultimately exfoliation of teeth. Plaque accumulation around teeth is the reason for periodontal breakdown.[1] Plaque is regarded as primary etiological factor in the development of chronic periodontitis. Gingivitis and periodontitis occurs when more virulent microbial flora colonize the subgingival

pocket and evade eradication by the host defenses.[2] Biofilm comprised of one or more communities of microorganisms, entrenched in a glycocalyx which are attached to a solid surface. There is communication between bacteria and microcolonies within the biofilm.[3] There are more > 500 species of bacteria at 10^8 –10^9 bacteria/milligram of dental plaque. There is variation in bacterial specie found in supragingival and subgingival plaque. Gram-positive cocci usually seen in supragingival plaque whereas subgingival plaque is characterized by flora predominated by Gram-negative anaerobic bacilli such as Porphyromonas gingivalis, Aggregatibacter.[4]

Host response and inflammation meant to eliminate the microbial insult are counterproductive and generate a deeper pocket within the dental socket that permits the microbial access to the alveolar bone. Dental implants are widely used nowadays.[5] They are inserted into the sockets which support crowns, bridges, and dentures. The excellent biocompatibility of implant material results mainly from its vital surface characteristics such as surface roughness and modifications, surface free energy, chemical composition of surface, and implant abutment fit.[6] The present study was conducted to assess the clinical and microbiological status of osseointegrated dental implant with that of a natural tooth.

MATERIALS & METHODS

The present study was conducted in the department of Periodontics. It comprised of 20 patients (12 males and 8 females) who received dental implants in last 1 year of both genders. All patients were informed regarding the study and written consent was obtained. Data such as name, age, gender etc. was recorded. A through clinical examination was performed in all patients. Patients were divided into 2 groups. In group I patient, subgingival plaque sample was collected from subgingival site around implant and in group II subgingival plaque sample was collected from a subgingival site around natural tooth distal to implant.

Parameters such as plaque index, sulcus bleeding Index probing pocket depth were recorded. Patients were recalled after 6 months and all parameters were reassessed. Microbiological analysis was done by polymerase chain reaction. Results thus obtained were subjected to statistical analysis. P value less than 0.05 was considered significant (P< 0.05).

RESULTS

Table I Correlation between clinical and microbiological findings for Porphyromonas gingivalis

Parameters	Group I	Group II	P value
Probing depth	4.38	3.65	0.12
Sulcular bleeding index	1.62	1.03	0.14
Plaque index	2.10	1.76	0.81

Table I shows that mean probing depth in positive samples of porphyromonas gingivalis in group I was 4.38 and in group II was 3.65, sulcular bleeding index was 1.62 in group I and 1.03 in group II and plaque index was 2.10 in group I and 1.76 in group II. The difference was non- significant (P> 0.05).

Table II Correlation between clinical and microbiological findings for Prevotella intermedia

Parameters	Group I	Group II	P value
Probing depth	4.15	3.81	0.14
Sulcular bleeding index	1.48	1.02	0.19
Plaque index	2.04	1.71	0.85

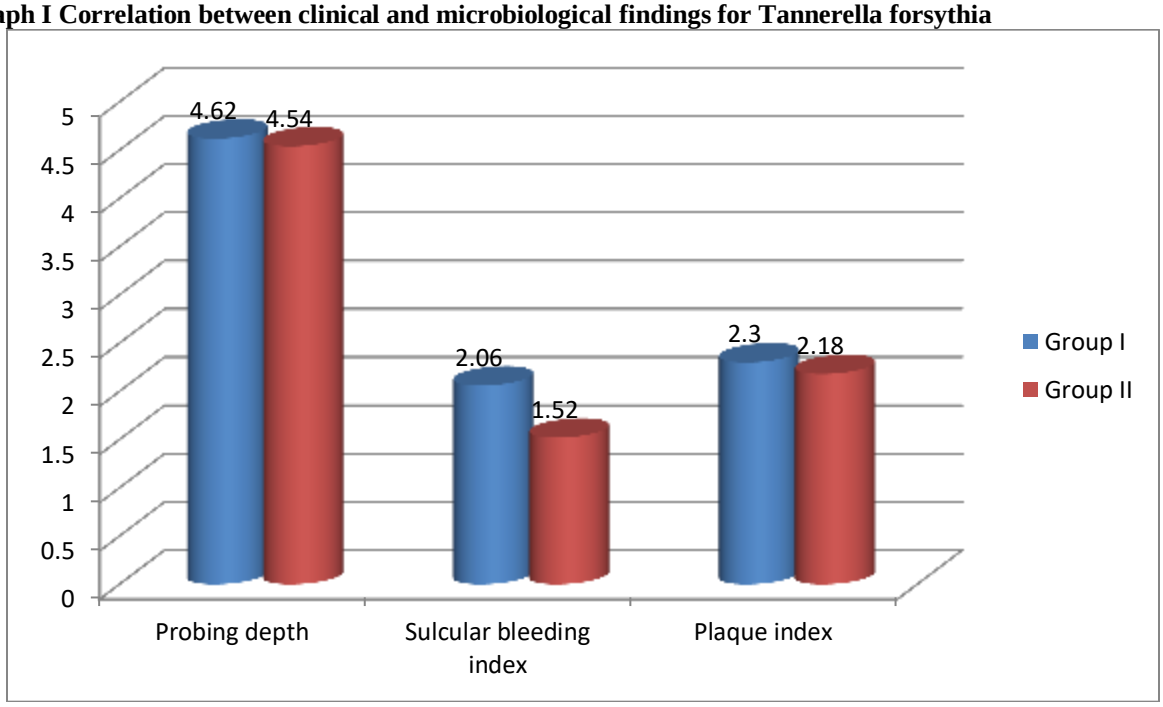
Table II shows that mean probing depth in positive samples of prevotella intermedia in group I was 4.15 and in group II was 3.81, sulcular bleeding index was 1.48 in group I and 1.02 in group II and plaque index was 2.04 in group I and 1.71 in group II. The difference was non- significant (P> 0.05).

Table III Correlation between clinical and microbiological findings for Tannerella forsythia

Parameters	Group I	Group II	P value
Probing depth	4.62	4.54	0.92
Sulcular bleeding index	2.06	1.52	0.82
Plaque index	2.30	2.18	0.94

Table III, graph I shows that mean probing depth in positive samples of Tannerella forsythia in group I was 4.62 and in group II was 4.54, sulcular bleeding index was 2.06 in group I and 1.52 in group II and plaque index was 2.30 in group I and 2.18 in group II. The difference was non- significant (P> 0.05).

Graph I Correlation between clinical and microbiological findings for Tannerella forsythia



DISCUSSION

Dental implants are widely used in partially or completely edentulous patients. The success of dental implants depends on many factors such as host response, local and systemic factors.[7] Periodontal pockets and other oral niches, such as the mucosa and tonsils, are reservoirs for the microbial pathogens that initiate the inflammation of the marginal soft tissue around the dental implants that may lead to implant failure. Microbial flora in dental plaque is responsible for the periodontal breakdown. Peri- implantitis is the inflammation around dental implants which is considered as main reason for dental implant failure.[8]

Dental implantation may be a direct consequence of periodontal disease; therefore the underlying microbial infection could threaten successful osseointegration of the implant if a microbial biofilm develops.[9] Reduction in peri-implantitis rates are shown when patients delay implant surgery after tooth extraction and rigorous preoperative and postoperative antibiotic regiments as well as improved dental hygiene are incorporated into the post-operative treatment.[10] The present study was conducted to assess the clinical and microbiological status of osseointegrated dental implant with that of a natural tooth.

In this study, we included 20 patients of which 12 were males and 8 were females. Patients were divided into 2 groups. In group I patient, subgingival plaque sample was collected from subgingival site around implant and in group II subgingival plaque sample was collected from a subgingival site around natural tooth distal to implant.

We found that mean probing depth in positive samples of porphyromonas gingivalis in group I was 4.38 and in group II was 3.65, sulcular bleeding index was 1.62 in group I and 1.03 in group II and plaque index was 2.10 in group I and 1.76 in group II. Kumar et al[11] in their study included 10 patients with healthy osseointegrated dental implants which subdivided into two groups such as Group A showing subgingival site corresponding to periimplant mucosa and group B showing subgingival site corresponding to natural tooth distal to implant. Authors found that there existed a definite correlation between clinical parameters such as sulcular bleeding index, plaque index, and periodontal pockets and the presence of these microorganisms, i.e., Porphyromonas gingivalis, Prevotella intermedia, Tannerella forsythia, and Aggregatibacter actinomycetemcomitans between the two groups.

We observed that mean probing depth in positive samples of prevotella intermedia in group I was 4.15 and in group II was 3.81, sulcular bleeding index was 1.48 in group I and 1.02 in group II and plaque index was 2.04 in group I and 1.71 in group II. Nakou et al[12] in their study evaluated the microbial composition of implants before insertion and 10 weeks after insertion of dental implants and they found that supra gingival plaque of implants was dominated by gram-positive cocci and rods and subgingival by hemophilus species and Veillonella parvula. The presence of these species depends on the ecological factors provided by artificial gingival crevice of permucosal implants in edentulous mouth.

We found that mean probing depth in positive samples of Tannerella forsythia in group I was 4.62 and in group II was 4.54, sulcular bleeding index was 2.06 in group I and 1.52 in group II and plaque index was 2.30 in group I and 2.18 in group II. It is found that multiple factors can lead to implant failure. Various studies indicated that microorganisms play a key role in causing peri-implantitis. It is evident that deposition of plaque on implants can induce peri-implant mucositis. It has been proved by various studies. The expression of distinct quantitative and qualitative differences in the microflora associated with successful and failing implants are in this favour. Another point is the placement of plaque-retentive ligatures in animals leading to shifts in the composition of the microflora and peri-implantitis. Furthermore antimicrobial therapy has found to improve the clinical status of peri-implantitis patients. It is also suggested that the level of oral hygiene has an impact on the long-term success of implant therapy.[13]

CONCLUSION

Authors found that there was correlation between microorganisms such as Porphyromonas gingivalis, Prevotella intermedia, Tannerella forsythia and sulcular bleeding index, plaque index, and periodontal pockets.

REFERENCES

1. Devides SL, Franco AT. Evaluation of peri-implant microbiota using the polymerase chain reaction in completely edentulous patients before and after placement of implant-supported prostheses submitted to immediate load. Int J Oral Maxillofac Implants 2006; 21:262–269.
2. Danser MM, van Winkelhoff AJ, Van der Velden U. Periodontal bacteria colonizing oral mucous membranes in edentulous patients wearing dental implants. J Periodontol 1997; 68:209–216.
3. Bower RC, Radny NR, Wall CD, Henry PJ. Clinical and microscopic findings in edentulous patients 3 years after incorporation of osseointegrated implant-supported bridgework. J Clin Periodontol 1989; 16:580–587.
4. Clarizio LF. Peri-implant infections. Atlas Oral Maxillofac Surg Clin North Am. 2000; 8:35–54.
5. George K, Zafiropoulos GG, Murat Y, Hubertus S, Nisengard RJ. Clinical and microbiological status of osseointegrated implants. J Periodontol 1994;65:766-70.
6. Heydenrijk K, Meijer HJ, van der Reijden WA, Raghoebar GM, Vissink A, Stegenga B, et al. Microbiota around root-form endosseous implants: A review of the literature. Int J Oral Maxillofac Implants 2002;17:829-38.
7. Palmisano DA, Mayo JA, Block MS, Lancaster DM. Subgingival bacteria associated with hydroxylapatite-coated dental implants: Morphotypes and trypsin-like enzyme activity. Int J Oral Maxillofac Implants 1991;6:313-8.
8. Lee KH, Maiden MF, Tanner AC, Weber HP. Microbiota of successful osseointegrated dental implants. J Periodontol 1999;70:131-8.
9. Van Winkelhoff AJ, Goené RJ, Benschop C, Folmer T. Early colonization of dental implants by putative periodontal pathogens in partially edentulous patients. Clin Oral Implants Res 2000;11:511-20.
10. Mombelli A. Microbiology of the dental implant. Adv Dent Res 1993;7:202-6.
11. Kumar A, Kawadkar A, Mathew D, Hegde S, Shankar RK. Comparison of clinical and microbiological status of osseointegrated dental implant with natural tooth. J Dent Implant 2017;7:46-53.
12. Nakou M, Mikx FH, Oosterwaal PJ, Kruijsen JC. Early microbial colonization of permucosal implants in edentulous patients. J Dent Res 1987;66:1654-7.
13. Koka S, Razzoog ME, Bloem TJ, Syed S. Microbial colonization of dental implants in partially edentulous subjects. J Prosthet Dent 1993;70:141-4.