

Assessment of Wound Healing in Dental Implants in Patients without Antibiotic Prophylaxis

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ABSTRACT

Background: Wound healing monitoring after surgery is an important concern in dentistry. Hence; we planned the present study to assess wound healing in dental implants in patients without antibiotic prophylaxis.

Materials & methods: The present study included assessment of wound healing in dental implants in patients without antibiotic prophylaxis. A total of 40 patients were enrolled in the present study and were broadly divided into two study groups with 20 patients in each group as follows: Antibiotic group: Patients were given prophylactic amoxicillin 500 mg thrice a week, Control group: Patients who were not given prophylactic antibiotic. Plaque index (PI) and gingival index (GI) in all the patients was obtained. Gingival crevicular fluid (GCF) samples were taken for the determination of cytokine levels. Peri-implant crevicular fluid (PICF) samples were obtained from the newly forming peri-implant crevice. All the samples were sent to laboratory for further analysis.

Results: Mean GI in the antibiotic group and the control group was 0.8 and 1.1 respectively. Mean PI of the antibiotic group and the control group were 0.9 and 1.2 respectively. While comparing the clinical parameters in between the two study groups postoperatively after one week, significant results were obtained.

Conclusion: Antibiotics should be given prophylactically in patients undergoing dental implant surgeries.

Keywords: Amoxicillin, Cytokines, Dental implant.

INTRODUCTION

Wound healing monitoring after surgery is an important concern in dentistry. It has been extensively studied in the past, both in animals and in humans, and several studies have recently been carried out to review all knowledge about clinical and histological features of uncomplicated oral wound healing.¹⁻³ Healing around endosseous implants involves hard and soft tissues. Peri-implant bone healing can be defined in distinct phases, including osteoconduction, de novo bone

formation, and bone remodeling, whereas soft tissue healing proceeds in inflammatory, proliferative, and remodeling phases.^{4,5}

Detection of early peri-implant tissue changes through conventional clinical methods (e.g., probing) is limited. GCF, with its rich content of locally-derived mediators, mimics wound fluid following surgery.⁶ Peri-implant healing begins when the surgeon prepares the bone to accept the metal implant (e.g., reaming and rasping of the femoral canal for a femoral stem). Preparation of

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the bone in such a manner is important for implant healing because: (1) it allows for initial implant stability, and (2) it causes bleeding that leads to formation of a hematoma.⁷⁻⁹ Hence; we planned the present study to assess wound healing in dental implants in patients without antibiotic prophylaxis.

MATERIALS & METHODS

The present study was designed in the department of oral implantology of the dental institute and it included assessment of wound healing in dental implants in patients without antibiotic prophylaxis. Written consent was obtained from all the subjects after explaining in detail the entire research protocol. Only those patients were included which were scheduled to undergo prosthetic rehabilitation of missing mandibular first molar by dental implants. Patients with presence of any form of bone metabolic disorder or any other systemic pathology were excluded from the present study. A total of 40 patients were enrolled in the present study and were broadly divided into two study groups with 20 patients in each group as follows:

Antibiotic group: Patients were given prophylactic amoxicillin 500 mg thrice a week,

Control group: Patients who were not given prophylactic antibiotic

Complete demographic and clinical details of all the patients were obtained. Plaque index (PI) and gingival index (GI) in all the patients was obtained. Gingival crevicular fluid (GCF) samples were taken for the determination of cytokine levels. Peri-implant crevicular fluid (PICF) samples were obtained from the newly forming peri-implant crevice. All the samples were sent to laboratory for further analysis. All the results were assessed by SPSS software. Chi-square test was used for assessment of level of significance.

RESULTS

A total of 40 patients were included in the present study, which were scheduled to undergo prosthetic rehabilitation of missing mandibular first molar. Mean age of the patients of the antibiotic group and the control group was 37.5 years and 39.5 years respectively. There were 10 males and 10 females in the antibiotic group, while there were 11 males and 9 females in the control group. Mean GI in the

antibiotic group and the control group was 0.8 and 1.1 respectively. Mean PI of the antibiotic group and the control group were 0.9 and 1.2 respectively. While comparing the clinical parameters in between the two study groups postoperatively after one week, significant results were obtained.

Table 1: Demographic characteristic.

Parameter		Antibiotic group	Control group
Mean age (years)		37.5	39.5
Gender	Male	10	11
	Female	10	9
Type of dental implant	Noris Medical Dental Implants System	12	11
	Adin Dental Implant Systems	8	9

Table 2: Comparison of clinical parameters postoperatively after one week.

Parameter	Antibiotic group	Control group	P- value
GI	0.8	1.1	0.01*
PI	0.9	1.2	0.02*
GCF/PICF volume (μL)	6.8	7.5	0.85
GCF/PICF IL-1β (pg/ml)	401	443	0.02*
GCF/PICF IL-8 (pg/ml)	4285	3745	0.00*

*: Significant

DISCUSSION

In the present study, mean PI of the antibiotic group and the control group were 0.9 and 1.2 respectively. While comparing the clinical parameters in between the two study groups postoperatively after one week, significant results were obtained. Xu L et al investigated the effects of local application of minocycline hydrochloride ointment (MHO) and

erythromycin eye ointment (EEO) on wound healing after flapless implant surgery. Forty patients with flapless implant surgery were enrolled and assigned randomly to three groups: 1) MHO group (n = 17); 2) EEO group (n = 18); and 3) control group (n = 5). All of them took systemic antibiotics; the control group did not receive the application of topical antibiotics. Three days after the surgical operation, clinical parameters, peri-implant crevicular fluid volume, and crevicular lipopolysaccharide (LPS) levels of all patients were collected, measured, and analyzed. Clinical outcomes of the two treatment groups were superior to results of the control group, indicating the effectivity of local antibiotics application in promoting early wound healing after flapless implant surgery. There was no obviously different effect between EEO and MHO in the early stages of healing. In addition, there were significant correlations between LPS level and all clinical parameters. The local application of antibiotics along with the systemic antibiotics could reduce the inflammatory response in wound healing after implant surgery.¹⁰ Mazzocchi A et al showed and valued the outcomes of dental implant treatment without antibiotic prophylaxis. The study included 437 consecutively treated patients, in whom a total of 736 implants were placed. The population received no prophylactic antibiotics, but received anti-inflammatory therapy (nimesulide 100 mg twice daily or Arnica montana 5C 3 times a day) for 3 days postoperatively. Healing was evaluated at second-stage surgery (4 to 6 months postoperatively). Failure was defined as removal of the implant due to either signs of infection or nonosseointegration of the implant, according to the criteria for success described by Albrektsson and Coll in 1988. The implant survival rate in the sample (96.2%) was no lower than the high success rates published in the literature using various antibiotic regimens. Their findings supported the results of several recent reviews of minor use of antibiotics in oral surgery.¹¹ Khoury SB et al determined whether peri-implant crevicular fluid (PICF) can be used to detect early changes around implants placed with one-stage surgical protocol following 1 week of healing. Twenty subjects (11 males and nine females; aged 22 to 72 years; two smokers) were included. Exclusion criteria were allergies to amoxicillin and systemic conditions that may affect healing. Subjects had a healthy

periodontium and needed a single implant; eight received antibiotic prophylaxis, and 12 served as controls. Clinical healing was evaluated with plaque and gingival indices (PI and GI, respectively). Gingival crevicular fluid (GCF) from the surgical site was obtained prior to the surgery, whereas PICF was collected at the 1-week visit. Enzyme-linked immunosorbent assay was used to determine GCF/PICF interleukin (IL)-1 β and -8 concentrations. Peripheral blood and GCF antibiotic levels were measured by high-performance liquid chromatography. Postoperative PI and GI were slightly increased. Total GCF and PICF volumes did not show a significant difference between appointments. There was an increase in PICF IL-1 β and -8 levels at 1week postoperatively. Mean amoxicillin serum concentration was 5.1 ± 2 μ g/ml at 1 to 4 hours following the initial dose, whereas GCF amoxicillin levels were below the limit of detection. Antibiotic prophylaxis had a modest effect on clinical indices (PI and GI) and no appreciable effect on biomarkers. PICF content can be studied as early as 1 week following one-stage implant placement.¹²

CONCLUSION

Under the light of above obtained data, the authors conclude that antibiotics should be given prophylactically in patients undergoing dental implant surgeries.

CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

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