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Original Article

Assessment of crestal bone loss in patients undergoing prosthetic rehabilitation by platform switching and non-platform switching dental implants: A comparative study

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ABSTRACT

Background: The platform switching (PLS) concept was introduced in the literature in 2005. Bone resorption around the implant neck is frequently observed after loading by a reduction in bone dimension, both horizontally and vertically. Hence; we planned the present study to compare the peri-implant crestal bone loss after placing non platform switched and platform switched dental implants.**Materials & methods:**The present study included assessment of a total of 20 patients who were broadly divided into two study group; group A- included patients who underwent platform switched implants, while group B- included subjects who underwent non-platform switched implants. Placement of dental implant was done. On follow-up, measurement of marginal bone loss was done. The Marginal bone loss was measured on the mesial and distal aspects of each implant using sequential standardized periapical radiographs and the long-cone paralleling technique. All the results were analyzed by SPSS software. **Results:**Non- significant results were obtained while comparing the mean marginal bone loss in patients of both the study groups.**Conclusion:**Mean marginal bone level change is similar in patients undergoing platform switching or non-platform switching dental implants

INTRODUCTION

The platform switching (PLS) concept was introduced in the literature in 2005. The biological benefits and clinical effectiveness of the PLS technique have been established by several studies.Crestal bone loss is a major criterion for implant success, which includes the evaluation of crestal bone level changes over time. This has been the initial diagnostic instrument used to depict periimplant states.[1- 4]Previous authors determined that a successful implant is defined in terms of marginal bone loss around an implant restoration, with no more than 1.5 mm during the first year and no more than 0.2 mm during each succeeding year.[5, 6] Bone resorption around the implant neck is frequently observed after loading by a reduction in bone dimension, both horizontally and vertically, and appears to depend on both biological and mechanical factors, such as surgical trauma to the periosteum, characteristics of the implant neck design, location of the implant/abutment joint, micromovements of the implant, and prosthetic components, the size of the microgap between the implant and the abutment, bacterial colonization of the implant sulcus, biologic width, and imbalance in the host parasite equilibrium.[7- 9]Hence; we planned the present study to compare the peri-implant crestal bone loss after placing non platform switched and platform switched dental implants.

Materials & methods

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1. The present study was conducted to assess the prognosis in patients undergoing platform switching and non-platform switching dental implants. A total of 20 patients were included in the present study. All the patients were broadly divided into two study group; group A- included patients who underwent platform switched implants, while group B- included subjects who underwent non-platform switched implants. Exclusion criteria for the present study included:

- Patients with history of any systemic illness,
- Patients with any known drug allergy,
- Patients with age of more than 25 years,
- Patients with history of any bone disorder or pathology
- Patients not having adequate bone thickness to accommodate a 4.5 mm diameter implants
- Patients not having the presence of opposing dentition.
- Patients with history of smoking or radiation therapy in the past.

Placement of dental implant was done. On follow-up, measurement of marginal bone loss was done. The Marginal bone loss was measured on the mesial and distal aspects of each implant using sequential standardized periapical radiographs and the long-cone paralleling technique. All the results were analyzed by SPSS software. Chi- square test was used for assessment of level of significance. P- value of less than 0.05 was taken as significant.

Results

Comparison of marginal bone loss in patients of both the study groups is shown in **Table 1**. Non- significant results were obtained while comparing the mean marginal bone loss in patients of both the study groups

Table 1: Comparison of marginal bone loss in patients of both the study groups

Time interval	Group A	Group B	P- value
0 to 3 months	-0.09	-0.06	0.22
0 to 6 months	-0.011	-0.019	

Discussion

In the present study, we didn't observe any significant difference in the mean marginal bone loss in patients of both the study groups (P- value > 0.05). Koutouzis et al did a study to prospectively evaluate changes in marginal bone levels and soft tissue dimensions around platform-switched, Morse taper–connection implants placed with the implant-abutment interface (IAI) at different positions in relation to the alveolar crest. In their study, thirty patients in need of single-tooth rehabilitations were randomly assigned to three groups based on the position of the IAI in relation to the alveolar crest at the time of implant placement. Implants in groups 0, 1, and 2 (n = 10 in each group) were placed at the bone level or 1 mm and 2 mm below the buccal aspect of the alveolar crest, respectively. Four months later, the implants were restored with crowns. Clinical parameters were recorded at 4 and 12 months, and marginal bone levels were assessed radiographically at placement, 4 months, and 12 months. Mean marginal bone loss below the implant platform in group 0 implants was 0.18 ± 0.27 mm at 4 months and 0.27 ± 0.45 mm at 12 months. All implants in groups 1 and 2 exhibited no marginal bone loss below the implant platform, since the first bone-to-implant contact was located at or above the implant margin. At 12 months, implants in

groups 1 and 2 exhibited greater mean bone loss above the implant platform compared to implants in group 0, but the differences were not statistically significant (group 0, 0.64 ± 0.49 mm; group 1, 0.81 ± 0.31 mm; group 2, 1.20 ± 0.68 mm). Implants in groups 1 and 2 exhibited a statistically significantly higher percentage of implant surfaces with bone on the implant platform compared to group 0 implants (90% versus 35%). They concluded that differences in peri-implant bone responses existed for implants placed with the IAI at different locations in relation to the alveolar crest.[10]Baig et al stated that the platform switching concept involves the reduction of the restoration abutment diameter with respect to the diameter of the dental implant. Crestal bone loss has been documented as one of the important factors that affect the long term prognosis of a dental implant. Platform switching for maintaining peri-implant bone levels has gained popularity among implant manufacturers over the last few years. However, the assumption that the inward shifting of the implant abutment junction may preserve crestal bone was primarily based on serendipitous finding rather than scientific evidence. The platform switching configuration led not only to a relative decrease in stress levels compared to narrow and wide standard configurations, but also to a notable stress field shift from bone towards the implant system, potentially resulting in lower crestal bone overloading. This study showed that platform switching helps to prevent crestal bone loss after implant placement and helps obtain satisfactory aesthetic results. They concluded that the use of implants with platform switching improves bone crest preservation and leads to controlled biological space reposition.[11]

Rossi et al did a study to obtain a randomized, clinical and radiological comparison of implants with and without platform switching (PFS). The two compared titanium implant types differed only in the microgap position: test (PFS) or control (StE, no PFS). All implants were inserted in posterior regions and followed up for six months after abutment connection (AC). Twenty one patients with 21 PFS and 18 StE implants completed the six-month evaluation. No implant failed. One complication (exposed cap screw) was reported at AC. No statistically significant difference was observed between the marginal bone level of PFS and StE implants. Their bone level stabilized approximately 1 mm below the microgap. Based on the outcome of this short-term study with a limited number of patients, it seems unlikely that the optimal clinical and radiological outcome obtained with the tested standard implant (no PFS) can be improved by introducing an inward microgap shift (PFS).[12]

Conclusion

From the above results, the authors concluded that Mean marginal bone level change is similar in patients undergoing platform switching or non-platform switching dental implants. However; future research is recommended.

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