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EVALUATION AND COMPARISON OF CRESTAL BONE CHANGES AROUND PLATFORM SWITCHED IMPLANTS VERSUS STANDARD IMPLANTS

Dr. Kay Kay Puying[1], Dr. Shalabh Mehrotra[2], Dr. Pooja Walia[3], Dr. Bharti Chaudhary[4], Dr. Bharti Singh[5]

Department of Periodontology and Oral Implantology, Teerthanker Mahaveer Dental College and Research Centre, Delhi Road, Moradabad (UP), India.

[1,5]PG Student, Department of Periodontology and Oral Implantology, Teerthanker Mahaveer Dental College and Research Centre, Moradabad, India
[2]Head of Department, Department of Periodontology and Oral Implantology, Teerthanker Mahaveer Dental College and Research Centre, Moradabad, India
[3]Associate professor, Department of Periodontology and Oral Implantology, Teerthanker Mahaveer Dental College and Research Centre, Moradabad, India
[4]Assistant professor, Department of Periodontology and Oral Implantology, Teerthanker Mahaveer Dental College and Research Centre, Moradabad, India

Abstract
Background: *Platform switching has emerged as a potential strategy to mitigate crestal bone loss around dental implants. This study aimed to compare marginal bone height changes between platform-switched and standard implants over six months.*
Methods: *A randomized controlled trial was conducted with 20 patients (10 per group) receiving either platform-switched (Group B) or standard implants (Group A). Crestal bone levels were assessed radiographically at baseline, 3 months, and 6 months post-crown placement. Statistical analysis included independent and paired t-tests.*
Results: *At 6 months, Group A exhibited significantly greater bone loss (2.600 ± 0.567 mm) compared to Group B (1.750 ± 0.589 mm; *p* = 0.001). Bone loss from 0–3 months was 1.750 ± 0.540 mm (Group A) vs. 1.400 ± 0.516 mm (Group B; *p* = 0.043). Progressive bone loss was observed in both groups, but platform-switched implants demonstrated superior preservation of crestal bone.*
Conclusion: *Platform switching significantly reduces crestal bone resorption, supporting its clinical use for enhanced implant longevity and peri-implant tissue stability.*
Keywords: *Dental implants, Platform switching, Crestal bone loss, Osseointegration, Randomized controlled trial.*

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I. Introduction

The loss of natural teeth has long been a clinical and psychological burden for patients, affecting not only oral function but also aesthetics and quality of life. Over the past few decades, dental implants have emerged as one of the most revolutionary advancements in restorative dentistry. Providing a reliable and often permanent solution for edentulous or partially edentulous patients, dental implants serve to restore both function and appearance by integrating directly with the jawbone through a process known as **osseointegration**. This biologic concept, first described by Brånemark in the mid-1960s, refers to the direct structural and functional connection between living bone and the surface of a load-bearing artificial implant, typically made of titanium [1].

Unlike traditional fixed prosthodontic restorations such as bridges, crowns, or dentures—which rely on adjacent teeth or mucosal support—dental implants function independently as root analogs. They support individual or multiple prosthetic teeth through a combination of a **titanium implant fixture**, an **abutment**, and a **ceramic crown**. The implant fixture is surgically placed into the jawbone, where it undergoes osseointegration, providing a stable foundation for the final prosthetic attachment. Because of their high success rates and versatility, dental implants have become the standard of care in many restorative cases.

As implantology has progressed, so too has our understanding of the biological and mechanical factors that influence implant success. In early implant designs, a key challenge was the **preservation of the crestal bone**—the bone surrounding the top portion of the implant, which plays a vital role in long-term implant stability. Numerous clinical studies have highlighted the significance of maintaining this marginal bone in both functional and aesthetic contexts. Despite high overall implant survival rates, **crestal bone loss** remains a common complication, particularly in the first year after loading, where bone loss of 1.5–2.0 mm is frequently reported [3].

Crestal bone loss is a multifactorial phenomenon influenced by biological, mechanical, and surgical factors. These include the formation of a microgap at the implant-abutment interface, microbial colonization, surgical trauma, implant surface characteristics, and loading protocols. Recent literature also suggests that the **design and fit of the implant-abutment connection** may significantly impact the extent of bone remodeling observed postoperatively [7,8]. While standard implant designs feature abutments that match the diameter of the implant platform, this configuration may concentrate stress and inflammatory infiltration at the crestal bone level, contributing to early bone resorption.

In an effort to counteract this, a novel concept known as **platform switching** has been introduced and increasingly adopted. First described in clinical practice by Canullo et al. [5], platform switching involves the intentional use of a **smaller diameter abutment** connected to a **wider diameter implant platform**. This configuration effectively shifts the implant-abutment junction inward, away from the outer edge of the implant collar. The biomechanical and biological rationale behind this approach is twofold: it **reduces the horizontal stress** transmitted to the crestal bone and **increases the distance between the microgap and the bone**, potentially limiting the spread of inflammatory infiltrate into the marginal bone area [4].

Biomechanical models, such as those developed by Maeda et al. [6], have provided evidence that platform switching alters stress distribution, transferring it more centrally within the implant body and away from the crestal bone. In addition, radiographic studies have demonstrated less vertical bone resorption in implants with platform-switched abutments compared to those with traditional matching components. By preserving the **biologic width**—the soft tissue attachment zone around the implant—platform switching may also improve soft tissue stability, reduce pocket formation, and enhance aesthetic outcomes, particularly in anterior regions [15–17].

While the concept of platform switching is promising, its clinical effectiveness remains the subject of ongoing debate. Some studies suggest a statistically significant reduction in crestal bone loss, while others report minimal or no difference when compared to conventional implant designs. Factors such as implant brand, surface texture, surgical protocol, and patient-specific variables (e.g., bone quality, occlusion, oral hygiene) may all influence outcomes, making it difficult to draw universal conclusions. Therefore, additional clinical evidence is required to validate the long-term benefits of platform switching and to understand how it interacts with other variables in implant dentistry.

One of the commercially available implant systems that employs both traditional and platform-switched designs is the **Adin Touareg-S** implant. Manufactured with specific macro- and micro design features aimed at enhancing initial stability and osseointegration, the Adin system provides an ideal model for evaluating the clinical impact of platform switching on crestal bone preservation. The Touareg-S implants feature a conical shape and a double-threaded design, which may contribute to better primary stability and favorable stress distribution, making them suitable for both immediate and delayed loading protocols.

This in-vivo study aims to **compare and assess crestal bone levels** around Adin (Touareg-S) implants with and without platform switching over a designated period. By evaluating bone remodeling radiographically and analysing the differences between the two groups, this research seeks to contribute to the growing body of evidence on the effectiveness of platform switching as a technique for minimizing crestal bone loss. Additionally, the study hopes to provide clinicians with actionable data that can aid in treatment planning, component selection, and long-term maintenance strategies in implant prosthodontics.

Understanding and controlling crestal bone loss is paramount not only for the mechanical success of the implant but also for its aesthetic integration and patient satisfaction. If platform switching proves to be a reliable method of preserving crestal bone levels, it could significantly enhance the predictability of implant therapy and support the broader goal of achieving optimal functional and aesthetic outcomes in modern dental rehabilitation.

II. Aim And Objectives

Aim:

To evaluate and compare the change in crestal bone height between platform switched and standard platform-matched implants.

Objectives:
- To evaluate the changes in height of crestal bone around platform switched implant and standard implants surface.
- To compare the changes in crestal bone level between regular implants and platform-switched implants.

Methodology
- Study Design: Randomized controlled clinical trial
- Sample Size: 20 implant sites, equally divided into two groups
- Groups:
- *Group A:* Platform-matched implants
- *Group B:* Platform-switched implants

Study Criteria:
1. Inclusion Criteria-
- Patients willing to undergo restoration with dental implant
- Age group of 18-65 years
- Good oral hygiene maintenance
- Adequate bone volume to accommodate an implant of appropriate dimension

2. Exclusion Criteria-
- Presence of active infection around the adjacent tooth
- Smokers
- Medically compromising conditions which prohibit implant surgery
- Medically compromised individuals
- Pregnant females and lactating mothers

Clinical Protocol

After selection of the subjects from the OPD, the patient's signed permission was acquired. and a detailed case history was recorded. Clinical and radiographic examination was done using CBCT to analyse the bone anatomy and selection of implant size. Post-op radiographic evaluation was made using the Paralleling technique along with a XCP holder and radiographic grid for precise radiographic interpretations. Blood investigation was done and case history was recorded. Under local anaesthesia a full thickness was reflected and implant (Adin Touareg-S) was placed at crestal level with copious irrigation at Rpm 1500-2000 with torque not exceeding 50 N/cm and less than 25 N/cm. Non resorbable suture (4.0) was used for suturing and medication including, Tab. Amoxicillin 500mg + clavulanic acid 125 mg BD, Tab. Aceclofenac 100 mg + paracetamol 325mg +

serratiopetides 15mg BD was given for 5 days, after meal and chlorhexidine gluconate 0.2% mouth rinse BD for 15 days. Patient was recalled after I week for suture removal and soft tissue healing was analysed. Crestal bone changes around implants was examined baseline, three months, and six months following crown implantation.

Fig. 1. Steps in implant insertion.

Statistical Analysis

The data for the present study was entered in the Microsoft Excel 2007 and analyzed using the SPSS statistical software 23.0 Version. The descriptive statistics included mean, standard deviation frequency and percentage. The level of the significance for the present study was fixed at 5%.

The intergroup comparison will be done using the independent t tests and intragroup comparison between time intervals will be done using the Paired t test The Shapiro–Wilk test was used to investigate the distribution of the data and Levine's test to explore the homogeneity of the variables.

III. Result

Intergroup Comparison Of Crestal Bone Height At 0 Months

	Mean	Standard Dev	Standard Error	P value	Significance
Group A	0.000	0.000	0.000	1.000	Non-Significant
Group B	0.000	0.000	0.000		

Table-1. Group 1 Non-Platform Switched Implants. **Group 2** Platform Switched Implants.

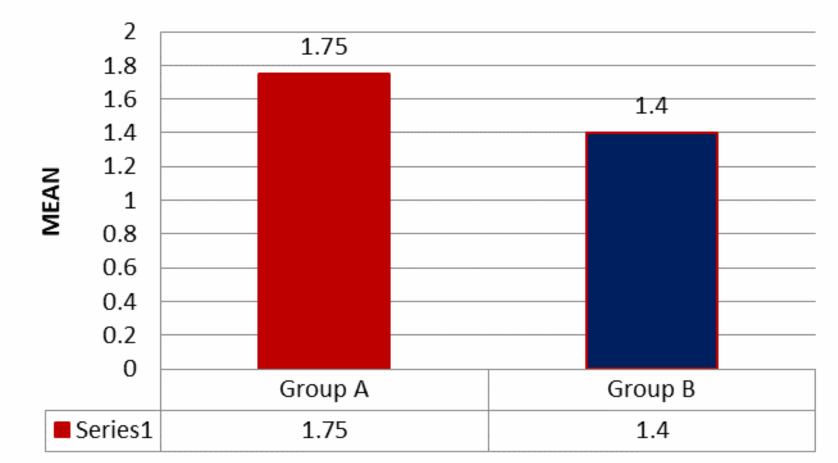
The intergroup comparison of crestal bone height at 0 months revealed a statistically significant difference between the two groups. Group A and Group B both exhibited mean values of 0.000 with standard deviations and standard errors also recorded as 0. 000.. The difference between the Group was statistically non-significant

Intergroup Comparison Of Crestal Bone Height At 3 Months

	Mean	Standard Dev	Standard Error	P value	Significance
Group A	1.750	0.540	0.170	0.043	Significant
Group B	1.400	0.516	0.163		

Table-2. Group 1 Non-Platform Switched Implants. **Group 2** Platform Switched Implants.

The intergroup comparison of crestal bone height at 3 months showed a statistically significant difference between the two groups. Group A (Non-Platform Switched Implants) exhibited a mean bone height of 1.750 ± 0.540 mm, with a standard error of 0.170. In contrast, Group B (Platform-Switched Implants) demonstrated a slightly lower mean bone height of 1.400 ± 0.516 mm, with a standard error of 0.163. The p-value for the comparison was 0.043, indicating statistical significance.

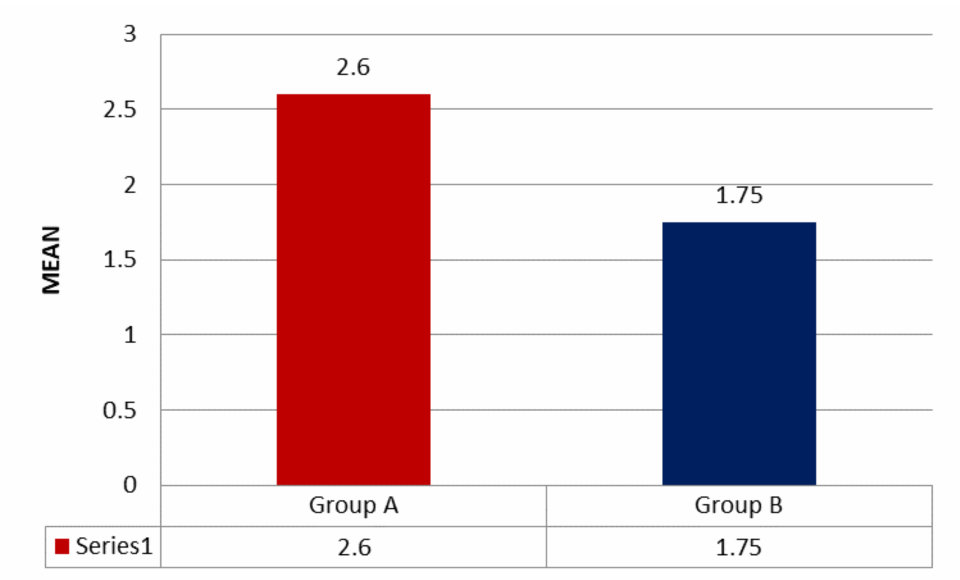


Intergroup Comparison Of Crestal Bone Height At 6 Months

	Mean	Standard Dev	Standard Error	P value	Significance
Group A	2.600	0.567	0.179	0.001	Significant
Group B	1.750	0.589	0.186		

Table-3. Group 1 Non-Platform Switched Implants. **Group 2** Platform Switched Implants.

The intergroup comparison of crestal bone height at 6 months demonstrated a statistically significant difference between the two groups. Group A (Non-Platform Switched Implants) exhibited a mean bone height of 2.600 ± 0.567 mm, with a standard error of 0.179. In contrast, Group B (Platform-Switched Implants) showed a lower mean bone height of 1.750 ± 0.589 mm, with a standard error of 0.186. The p-value for this comparison was 0.001, indicating a highly significant difference.

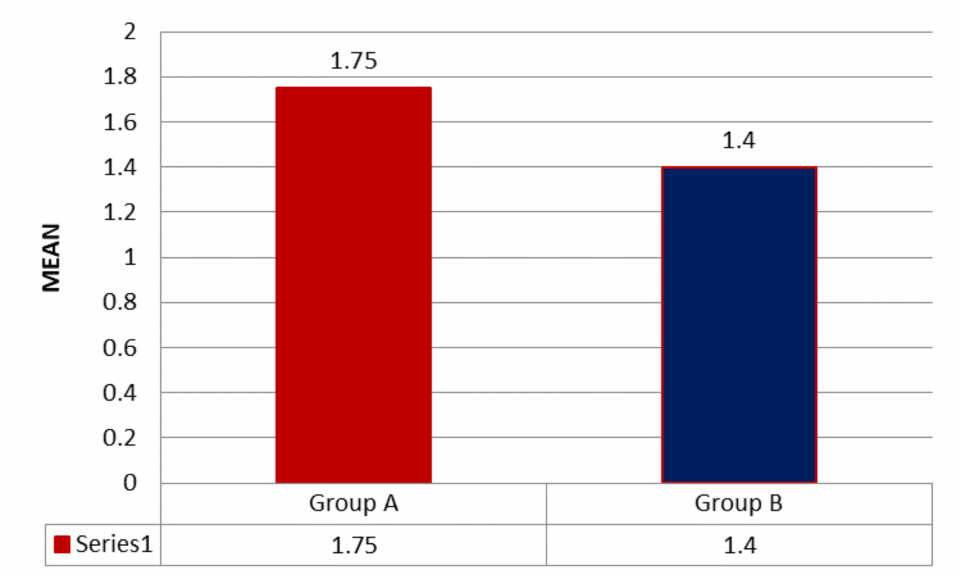


Intergroup Comparison Of Change In Crestal Bone Height 0-3 Months

	Mean	Standard Dev	Standard Error	P value	Significance
Group A	1.750	0.540	0.170	0.043	Significant
Group B	1.400	0.516	0.163		

Table-4. Group 1 Non-Platform Switched Implants. **Group 2** Platform Switched Implants.

The intergroup comparison of the change in crestal bone height from 0 to 3 months revealed a statistically significant difference between the two groups. Group A (Non-Platform Switched Implants) showed a mean bone loss of 1.750 ± 0.540 mm, with a standard error of 0.170. In comparison, Group B (Platform-Switched Implants) exhibited a slightly lower mean bone loss of 1.400 ± 0.516 mm, with a standard error of 0.163. The p-value for this comparison was 0.043, indicating statistical significance.

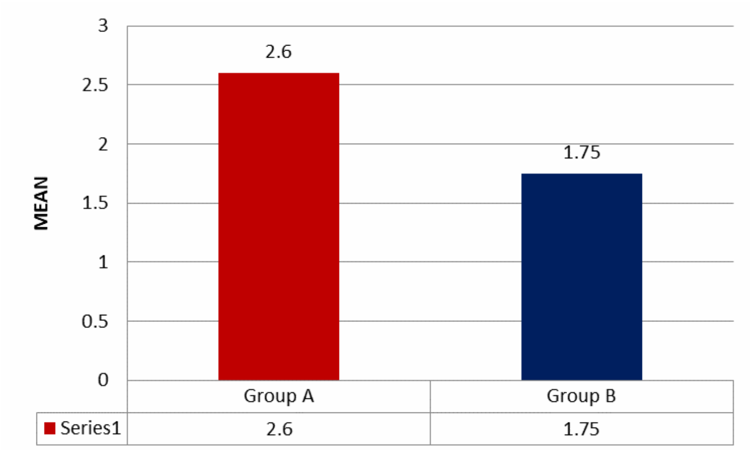


Intergroup Comparison Of Change In Crestal Bone Height 0-6 Months

	Mean	Standard Dev	Standard Error	P value	Significance
Group A	2.600	0.567	0.179	0.001	Significant
Group B	1.750	0.589	0.186		

Table-5. Group 1 Non-Platform Switched Implants. **Group 2** Platform Switched Implants.

The intergroup comparison of the change in crestal bone height from 0 to 6 months demonstrated a statistically significant difference between the two groups. Group A (Non-Platform Switched Implants) exhibited a mean bone loss of 2.600 ± 0.567 mm, with a standard error of 0.179. In contrast, Group B (Platform-Switched Implants) showed a lower mean bone loss of 1.750 ± 0.589 mm, with a standard error of 0.186. The p-value for this comparison was 0.001, indicating a highly significant difference. These findings suggest that non-platform switched implants experienced greater cumulative crestal bone loss over the six-month period compared to platform-switched implants.



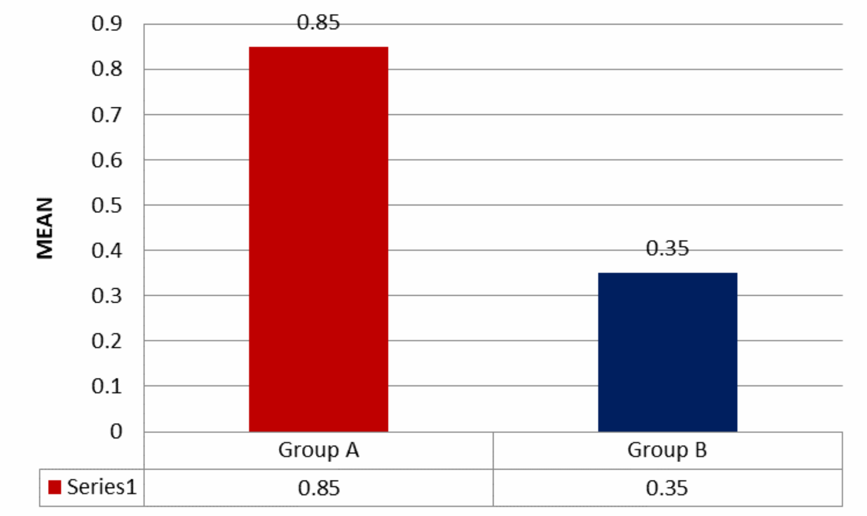
Intergroup Comparison Of Change In Crestal Bone Height 3-6 Months

	Mean	Standard Dev	Standard Error	P value	Significance
Group A	0.850	0.579	0.183	0.001	Significant
Group B	0.350	0.411	0.130		

Table-6. Group 1 Non-Platform Switched Implants. **Group 2** Platform Switched Implants.

The intergroup comparison of the change in crestal bone height from 3 to 6 months revealed a statistically significant difference between the two groups. Group A (Non-Platform Switched Implants) exhibited a mean bone loss of 0.850 ± 0.579 mm, with a standard error of 0.183. In contrast, Group B (Platform-Switched Implants) showed a lower mean bone loss of 0.350 ± 0.411 mm, with a standard error of

0.130. The p-value for this comparison was 0.001, indicating a highly significant difference. These findings suggest that crestal bone loss continued in both groups between 3 and 6 months,



Intragroup Comparison Of Mean Bone Height Between Different Time Intervals In Both The Groups

	Baseline	3 Months	6 Months	P value	Significance
Group A	0.000±0.000	1.750±0.540	2.600±0.567	0.001	Significant
Group B	0.000±0.000	1.400±0.516	1.750±0.589	0.001	Significant

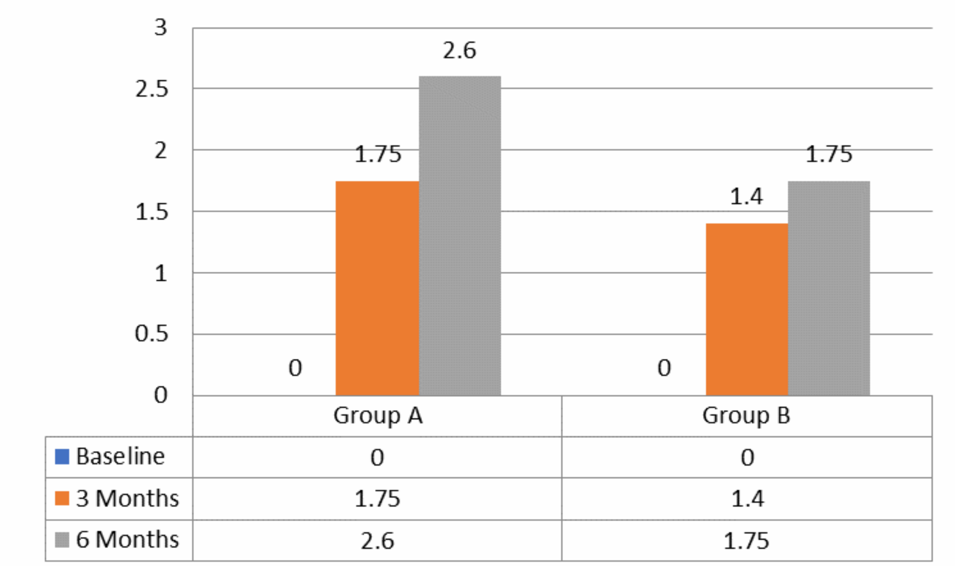
Table-7. Group 1 Non-Platform Switched Implants. **Group 2** Platform Switched Implants.

The intragroup comparison of mean crestal bone height at different time intervals within both groups demonstrated statistically significant changes over time.

In **Group A** (Non-Platform Switched Implants), the mean bone height increased from **0.000 ± 0.000 mm at baseline** to **1.750 ± 0.540 mm at 3 months** and further to **2.600 ± 0.567 mm at 6 months**. The p-value for this comparison was **0.001**, indicating a statistically significant difference in bone loss over time.

Similarly, in **Group B** (Platform-Switched Implants), the mean bone height increased from **0.000 ± 0.000 mm at baseline** to **1.400 ± 0.516 mm at 3 months**, reaching **1.750 ± 0.589 mm at 6 months**. This change was also statistically significant, with a p-value of **0.001**.

These findings indicate that both groups experienced progressive crestal bone loss over the 6-month period. However, Group A (Non-Platform Switched Implants) showed greater bone loss compared to Group B (Platform-Switched Implants), further supporting the potential benefit of platform switching in reducing crestal bone resorption over time.



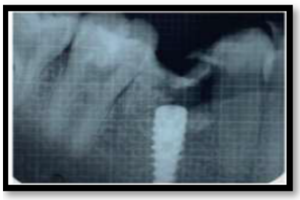


Fig.1 Post-Op Radiograph

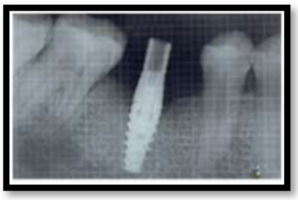


Fig.2 Radiograph at Baseline

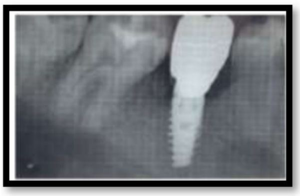


Fig.3 Radiograph at 3 months after crown placement

Fig.4 Radiograph at 6 months after crown placement

Fig.1-4. Follow up series of radiographs with grid for Group A (Platform-matched implants).

Fig.5 Post-Op Radiograph

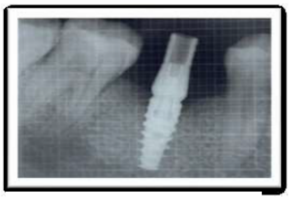


Fig.6 Radiograph at Baseline

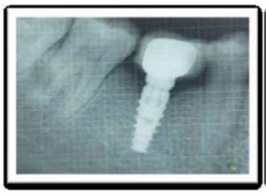


Fig.7 Radiograph at 3 months after crown placement

Fig.8 Radiograph at 6 months after crown placement

Fig.5-8. Follow up series of radiographs with grid for Group B (Platform-switched implants).

IV. Discussion

Dental implantology has advanced significantly in recent decades, offering patients improved functional and aesthetic outcomes. Among the innovations in implant design, the concepts of platform switch implants and platform match implants have garnered significant attention in clinical practice. Both strategies involve the relationship between the diameter of the implant's attachment to the abutment is known as the implant platform and the restorative components used to secure the prosthesis, but they differ in their approach and clinical outcomes.

A platform switch implant refers to a design where the diameter of the implant platform is narrower than that of the abutment, creating a mismatch between the two components. This technique has been associated with benefits such as enhanced soft tissue preservation, reduced crestal bone loss, and improved esthetics. On the other hand, platform match implants keep the distance between the abutment and the implant platform constant., promoting a direct and stable connection. This approach is believed to offer stability, ease of restoration, and potentially faster healing times.

In the present study 20 patients were selected and divided in 2 groups i.e Group A and Group B. In Group A conventional platform matched dental implant were used. Whereas in Group B platform switched design was adopted. After the insertion of implants, crown was placed and at intervals of three and six months, the crestal bone alterations or the amount of bone loss were assessed for both groups.

Though CBCT analysis was done to assess the bone morphology and to determine the implant size. Post-op radiographic evaluation was made using the Paralleling technique along with a XCP holder and radiographic grid for precise radiographic interpretations. The changes were measured against the radiograph recorded at baseline.

In Group A crestal bone changes had mean value of 0.000 at baseline which changed to mean value at 1.750 ± 0.540 mm 3 months and mean value of 2.600 ± 0.567 mm at 6 months. The difference of mean value from baseline to 6 months was 2.600 ± 0.567 mm with the p-value of 0.001 which was statistically significant.

In Group A (Non-Platform Switched Implants), the mean bone height increased from 0.000 ± 0.000 mm at baseline to 1.750 ± 0.540 mm at 3 months and further to 2.600 ± 0.567 mm at 6 months after crown placement. There was a statistically significant difference, as indicated by the comparison's p-value of 0.001 in bone loss over time. These finding suggest that there has been a significant reduction in crestal bone around the implant using the conventional platform matched dental implant.

It considered that the aetiology of bone remodelling depended on the localised inflammation of the soft tissue around the implant. This view was supported, according to Jensen et al. (1997), especially in view of the tiny opening at the implant-abutment contact where inflammatory cells can enter the abutment and where bacterial infiltration is always possible. The vertical extension of this infiltration was approximately 0.5-0.75 mm apical and 0.5-0.75 mm coronal to the IAJ.

Radiographically, Hermann et al. (1997) found that there was a 1.5-unit initial loss of bone around implants, after which the level stabilized. In a more recent investigation, Warren et al. (2002) found that crestal bone resorption of 1.0 to 1.5 mm may occur very immediately after implant loading. These results are consistent with those of other writers. Weng D. and others (2008)

Platform-switched dental implants in Group B. Following implant insertion, a crown was implanted, and three to six months later, the crestal bone alterations or the amount of bone loss were assessed. The mean bone height increased from 0.000 ± 0.000 mm at baseline to 1.400 ± 0.516 mm at 3 months, reaching 1.750 ± 0.589 mm at 6 months after crown placement. This change was also statistically significant, with a p-value of 0.001.

whereas the difference in mean value at1.400 ± 0.516 mm at 3 months, reaching 1.750 ± 0.589 mm at 6 with p value 0.001 change was also statistically significant. Therefore, the difference in the mean bone height increased from 0.000 ± 0.000 mm at baseline to 1.400 ± 0.516 mm at 3 months, reaching 1.750 ± 0.589 mm at 6 months. This change was also statistically significant, with a p-value of 0. 001.These finding suggest that Platform-switching implants showed significantly less marginal bone loss compared to standard implants.

The placement of a smaller diameter abutment on a larger diameter implant platform is known as the "platform switching concept," which is a more contemporary strategy aimed at reducing or managing the horizontal component of bone loss. In order to protect marginal bone from stress concentration, this connection moves the perimeter of the implant-abutment junction inward towards the implant's central axis. Additionally, inward migration of IAJ is anticipated to limit crestal bone resorption by shifting the infiltration of inflammatory cells away from the neighbouring crestal bone and towards the central axis of the implant. Also, the final positioning of the crown margin and the resulting cosmetic outcome are determined by the length of the abutment collar, affects crestal bone loss and soft tissue stability.

Although the results are consistent with those reported by Veis y cols and Fickl and cols [49–54] and better than those of Cocchetto and cols, Crespi and cols, and Cappiello and cols, there is currently no definitive information in the literature regarding the relative impact of implant-pillar configuration on marginal bone loss. But according to recent research, an internal abutment-implant arrangement preserves marginal bone height better than an exterior connection (0.24 ± to 0.29 mm against 1.14 ± 0.54 mm) [55].

According to the study's findings, crestal placement of platform-changing implants is a workable substitute for prosthetic rehabilitation as it demonstrated optimal stability, aesthetics, and acceptable marginal bone levels throughout the first six months of implant functional life. At the mesial and distal levels, the average amount of bone remodelling was 0.5 mm and 1.5 mm, respectively. These findings are in line with other findings published in the literature. [33-38].

There is currently a lack of clinical evidence in the literature regarding the true impact of platform switching on maintaining soft tissue and bone, despite the fact that the majority of clinical studies have demonstrated that it improves crestal bone stability. The results have also remained inconsistent and unclear. Because the development of an inflammatory infiltrate that extended vertically along the surface of the implant occurred with implants supported by abutments of the same diameter, the inflammatory connective tissue had to localize more inwardly with implants that underwent platformswitching, reducing the range of exposure on the adjacent hard tissues and exacerbating the negative effect on the bone.

The horizontal and vertical positioning of the abutment/implant junction with respect to the alveolar crest, has been shown to influence bone loss in the peri-implant at the margin. [34]. As the platform shifts, the abutment/implant interface separate from the bone around it and travels horizontally to the implant's central axis. Therefore, when bacterial filtration, micromovements, and stress concentration move away from the crest and bone-implant contact, there is less apical migration of the biological width and, as a result, less marginal bone resorption [34, 35]. The degree of crestal bone loss is directly correlated with the quantity of inflammatory cell infiltration in the peri-implant at zone [39]. The position and intensity of the inflammatory infiltration are linked to the implant's vertical insertion depth in relation to the alveolar crest [40].

Notably, there are restrictions and conflicting data on the use of two-piece implants with platform change in a subcrestal position. Specifically, some research findings report Although some do not support it, some believe that positioning the implant in a subcrestal location may benefit little variations in bone level [43–46]. A study on human histology found that all equicrestal implants showed crestal bone resorption of 0.5 to 1.5 mm. but all subcrestally positioned implants had bone formation on the implant shoulder [47]. There is noticeable distinction in the extent of the X-ray marginal bone loss between investigations.

A recent thorough study indicated that the average bone loss around implants implanted at the Subcrestal level rose from 0.05 mm to 1.40 ± 0.50 mm after a follow-up of 6 to 60 months [48]. Discrepancies between the studies have been attributed to differences in implant-pillar connection, platform surface texture, surgical technique, inter implant distance, repeated disconnection/reconnection of the healing pillar and the initial thickness of the mucosa.

Previous histology studies have connected repeated abutment manipulation to changes in the level of the crestal bone during the first healing phase and the apical placement of connective tissue.[56].Interestingly, compared to matched implant-pillar configurations, these negative effects were less common with platform-changing implants.

The quality of peri-implant inflammation management, treatment, and support is known to be critical to the long-term effectiveness of implant-retained restorations. Remarkably, in both healthy and periodontally affected patients, the behaviour of the peri-implant at the soft and hard tissues is identical. These results are in agreement with other studies [54, 55]. According to them, if patients with treated periodontitis get supportive, regulated periodontal care and have their periodontal index checked on an individual basis, the amount of marginal bone loss surrounding implants is rather small [56].

In our current study in Group A (Non-Platform Switched Implants), the mean bone loss increased from 0.000 ± 0.000 mm at baseline to 1.750 ± 0.540 mm at 3 months and further to 2.600 ± 0.567 mm at 6 months. The p-value for this comparison was 0.001, indicating a statistically significant difference in bone loss over time. In Group B (Platform-Switched Implants), the mean bone loss increased from 0.000 ± 0.000 mm at baseline to 1.400 ± 0.516 mm at 3 months, reaching 1.750 ± 0.589 mm at 6 months. This change was also statistically significant, with a p-value of 0.001.

These findings indicate that both groups experienced progressive crestal bone loss over the 6-month period. However, Group A (Non-Platform Switched Implants) showed greater bone loss compared to Group B (Platform-Switched Implants), further supporting the potential benefit of platform switching in reducing crestal bone resorption over time.

This study has certain limitations that need to be taken into account, including the sample size and study time. Studies should think about expanding the number of participants in each group (test and control) in order to obtain a representative sample of the population and avoid any desertions. Since the current study was only conducted for six months, a longer study period would aid in our understanding of the pattern of bone resorption. To be more precise, bone crest levels can also be determined using cone-beam CT and associated software.

V. Conclusion

Based on the results of this study, the following conclusions can be drawn:

1. In the non-platform switched group, bone loss was not significant at baseline but became statistically significant at both 3 and 6 months after crown placement.
2. Platform-switched implants also showed significant bone loss at these time points, though the amount was notably less than in the non-platform switched group.
3. Comparing both groups, significant differences in crestal bone loss were observed at 3 months, with more pronounced differences at 6 months post-restoration.

Overall, while both implant types experienced progressive crestal bone loss over the 6-month period, the platform-switched implants demonstrated considerably less bone resorption. These findings highlight the advantage of platform switching in preserving marginal bone levels over time compared to standard (platform-matched) implants.

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